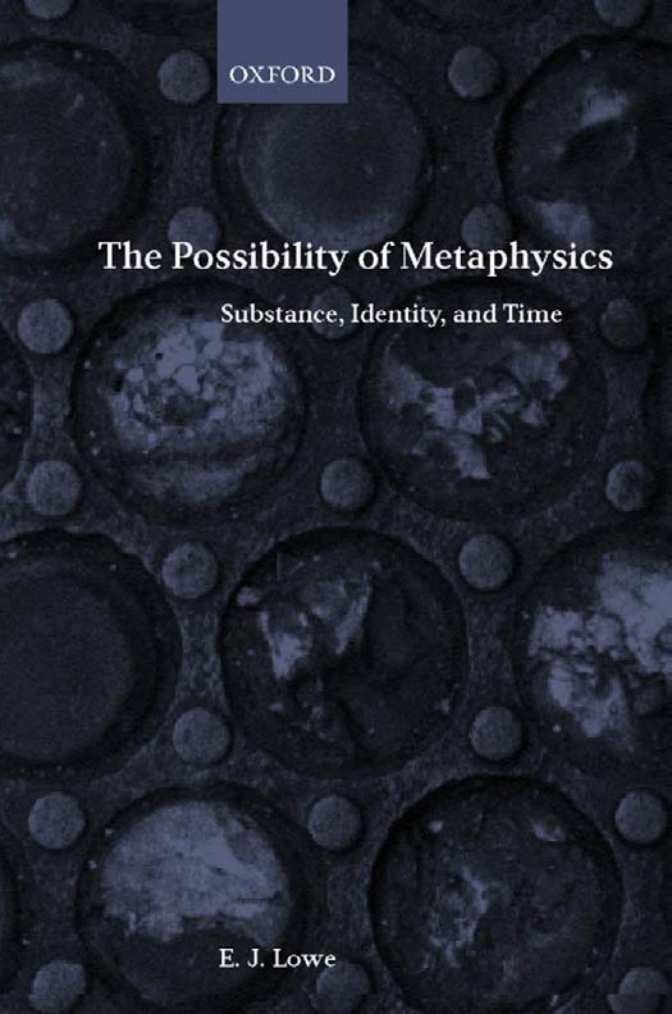
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The Possibility of Metaphysics
Substance, Identity, and Time
E. J. Lowe

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Substance, Identity, and Time

E. J. Lowe

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First published in paperback 2001
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British Library Cataloguing in Publication Data
Data available
Library of Congress Cataloging in Publication Data
Data available
ISBN 0–19–823683–2 (hbk)
ISBN 0–19–924499–5 (pbk.)

Preface

My overall objective in this book is to help to restore metaphysics to a central position in philosophy as the most fundamental form of rational inquiry, with its own distinctive methods and criteria of validation. In my view, all other forms of inquiry rest upon metaphysical presuppositions—thus making metaphysics unavoidable—so that we should at least endeavour to do metaphysics with our eyes open, rather than allowing it to exercise its influence upon us at the level of uncritical assumption. I believe that this is beginning to be acknowledged more widely by philosophers as various research programmes—for instance, in the philosophy of mind and in the philosophy of quantum physics—are being seen to flounder through inadequacies in their metaphysical underpinnings. For that reason, I hope that a book like this will prove to be a timely one.

Because Chapters 1 and 2 partly serve to introduce themes explored in greater detail later in the book, I have not written an Introduction as such. Doing so would have involved unnecessary repetition. However, it may help the reader if I supply here a brief synopsis of the book's contents. In Chapter 1, I attempt to characterize the distinctive nature of metaphysics as an autonomous intellectual discipline and defend a positive answer to Kant's famous question, 'How is metaphysics possible?', distinguishing my own answer from that of various other schools of thought, including some latter-day heirs of Kantianism. A key ingredient in my defence of metaphysics is the articulation of a distinctive and, in my view, indispensable notion of *metaphysical possibility*—conceived of as a kind of possibility which is not to be identified with physical, logical, or epistemic possibility.

Chapter 2 is devoted to an examination of two of the most fundamental and all-pervasive notions in metaphysics—the notion of an *object* and the notion of *identity*—and explores their interrelationships. In the course of this exercise a central ontological distinction—that between *concrete* and *abstract* objects—is brought to the fore, my contention being that this is at bottom a distinction between those objects that do, and those that do not, *exist in time*. In Chapter 3 I extend my examination of the notion of an object by discussing its relationship with the notion of *unity* and in so doing argue for the recognition of various categories of entities which lack either the determinate identity or the determinate unity characteristic of objects. Such categories, I suggest, need to be recognized in order to make

sense of some of the discoveries and theories of modern physics, especially quantum physics, and to allow for the possibility of still stranger theories in the future.

Time—already a recurrent background theme of the preceding chapters—is brought into focus in Chapter 4, where I discuss some deep-rooted differences between philosophers over the place of *tense* in an account of the nature of time: my position being that only a tensed view of time can ultimately explain satisfactorily what it is for things to exist in time and persist through change. The theme of time and persistence continues in Chapter 5, where I argue that the very existence of time—and more particularly the temporal unity of the world as one world in time—is dependent upon the existence of concrete individual *substances* persisting through time, with the consequence that persisting substances cannot coherently be conceived to be mere sequences or aggregates of successively existing entities ('temporal parts' or 'time-slices').

The arguments of Chapter 5 more or less take the concept of substance for granted and so part of the aim of Chapter 6 is to provide a rigorous definition of substance, in terms of the crucial notion of *existential dependency.* At the same time, I begin to build up a picture of the relationships between the category of substance and other categories of entities at the same ontological level—entities such as events, properties, places, and times. This picture is further developed in Chapter 7, where I go on to argue for quite general reasons that certain fundamental kinds of substance—what I call *primitive substances*—must exist in order to provide the ultimate existential grounding of all concrete existence. Such substances are distinctive in that their identity through time is itself primitive or ungrounded. However, identifying these substances is a more difficult matter than arguing in a general way for the necessity of their existence.

In the following chapter, Chapter 8, I complete the account of ontological categories begun in Chapters 6 and 7 by explaining why and how such categories, which have an a priori status, must be distinguished from the empirically discoverable *natural kinds* into which objects (and, more particularly, substances) are divisible. In Chapter 9, I turn my attention to the Aristotelian distinction between *matter* and *form,* a version of which I want to defend in order to provide an account of the nature of composite substances which is consistent with the argument for primitive, non-composite substances advanced earlier in Chapter 7. Macroscopic, composite substances such as tables, stars, and animals constitute the lived world of everyday human experience, and it is well that a metaphysical system should acknowledge their reality even if it does not take them to be ontologically basic. Accordingly, I contend that a composite substance is not to be identified with the mereological sum of its component

parts, nor is it to be identified with a bundle of compresent 'tropes' or property instances, for neither of these reductivist theories do justice to the nature of substances.

In Chapter 10, following the prolonged examination of concrete objects in the preceding chapters, a return is made to the subject of abstract entities. Here I distinguish a number of different senses in which entities may be described as being 'abstract' and discuss the nature and existence of some of the most important varieties of abstract objects—universals, sets, and numbers. Then, in Chapter 11, I consider the nature of *facts* or *states of affairs*—which by some accounts are concrete and by other accounts abstract entities—and challenge the view (one of the chief rivals to my own substance-based ontology) that holds facts or states of affairs to be the building-blocks of the world. Finally, Chapter 12 concludes the book with a discussion of what is perhaps the most puzzling question in all of metaphysics: *why should there be anything at all*—that is, why is there a world of objects existing in space and time? In attempting to answer this question, I look again at the relationship between abstract and concrete objects and try to connect it with the distinction between necessary and contingent existence.

There is one other general point which I should make about the composition of this book. This is that I have tried to make its chapters intelligible relatively independently of each other, in the interests of those readers who wish to focus on certain issues to the exclusion of others. A consequence of this is that certain points are restated in different places in the book, though I have tried to keep such repetition to an absolute minimum, consistent with the demands of independent intelligibility. And even those readers who persevere with the whole book will, I think, find such reminders helpful, particularly in view of the often complicated interrelationships between different theses that are defended in it.

Earlier versions of some of the ideas in this book have already received a public airing in various published articles of mine, though much else in it is quite new, as is the attempt to integrate these ideas into an overall system of metaphysics. In particular, Chapter 1 draws on 'Die Metaphysik und ihre Möglichkeit', first published in J. Brandl, A. Hiecke, and P. Simons, eds., *Metaphysik: Neue Zugänge zu alten Fragen* (St Augustin: Academia Verlag, 1995); Chapter 2 draws on 'Objects and Criteria of Identity', first published in B. Hale and C. Wright, eds., *A Companion to the Philosophy of Language* (Oxford: Blackwell, 1997); Chapter 3 draws on 'Entity, Identity and Unity', *Erkenntnis,* 46 (forthcoming 1998) (reprinted here by permission of Kluwer Academic Publishers), and on 'Vague Identity and Quantum Indeterminacy', *Analysis,* 54 (1994): 110–14; Chapter 4 draws on 'Tense and Persistence', in R. Le Poidevin,

ed., *Questions of Time and Tense* (Oxford: Clarendon Press, 1998); Chapter 5 draws on 'Substance, Identity and Time', *Proceedings of the Aristotelian Society,* supp. vol. 62 (1988): 61–78, on 'Lewis on Perdurance versus Endurance', *Analysis,* 47 (1987): 152–4, and on 'The Problems of Intrinsic Change: Rejoinder to Lewis', *Analysis,* 48 (1988): 72–7; Chapter 6 draws on 'Ontological Dependency', *Philosophical Papers,* 23 (1994): 31–48; Chapter 7 draws on 'Primitive Substances', *Philosophy and Phenomenological Research,* 54 (1994): 531–52; Chapter 8 draws on 'Ontological Categories and Natural Kinds', *Philosophical Papers,* 26 (1997): 29–46; Chapter 9 draws on 'Form without Matter', *Ratio,* 11 (forthcoming 1998); Chapter 10 draws on 'The Metaphysics of Abstract Objects', *Journal of Philosophy,* 92 (1995): 509–24, and on 'Are the Natural Numbers Individuals or Sorts?', *Analysis,* 53 (1993): 142–6; and Chapter 12 draws on 'Why is There Anything at All?', *Proceedings of the Aristotelian Society,* supp. vol. 70 (1996): 111–20.

I am extremely grateful to the following people for their comments on various parts of the book or on the papers which preceded it: Thomas Baldwin, David Cockburn, Steven French, Bob Hale, John Heil, Eli Hirsch, Joshua Hoffman, O. R. Jones, Robin Le Poidevin, Susan Lowe, Anna Maidens, Michael Martin, Trenton Merricks, Stephen Mumford, Harold Noonan, David Oderberg, David Over, Gary Rosenkrantz, Peter Simons, Peter Smith, Alan Weir, and audiences at the Universities of Durham, Edinburgh, Innsbruck, Keele, Leeds, Nottingham, Reading, St Andrews, Salzburg, Sheffield, Stirling, and York, St David's University College at Lampeter, The Queen's University of Belfast, University College Dublin, University College London, and the University of North Carolina at Greensboro. Finally, I should especially like to thank Peter Momtchiloff of Oxford University Press for his encouragement and advice, two anonymous readers for Oxford University Press for their very helpful suggestions and constructive criticisms, and Angela Blackburn for her invaluable recommendations in matters of style and her supremely efficient editing and typesetting of the manuscript.

E.J.L.

Durham

November 1997

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1 The Possibility of Metaphysics

In the Preface, I explained that the overall objective of this book is to help to restore metaphysics to a central position in philosophy as the most fundamental form of rational inquiry, with its own distinctive methods and criteria of validation. But if such a project is not to be stifled even before its inception, we need to have some assurance that its aim is a coherent and legitimate one. To provide such assurance is the purpose of this first chapter, which will also serve as an introduction to some of the book's main themes.

1. What Is Metaphysics?

It was Immanuel Kant who first asked 'How is metaphysics possible?'[1] But Kant supposed the subject-matter of metaphysics to comprise a priori synthetic truths, and we have since come to doubt whether there is such a class of truths, not least because the analytic/synthetic distinction has itself become doubtful following W. V. Quine's attack on it.[2] The a priori/a posteriori distinction, on the other hand, is still taken seriously, and indeed has had new life breathed into it by the work of Saul Kripke.[3] But Kripke's work, too, undermines Kant's epistemological assumptions by implying that necessary truths need not be a priori nor contingent truths a posteriori. In the light of these reconceptions, Kant's question 'How is metaphysics possible?' needs to be asked anew, and even to be understood in a new way. But the question is quite as pressing for us as it was for Kant. Metaphysics is under assault from many sides, both from within the ranks of philosophers and from various external forces. Despite these attacks, metaphysics has been enjoying something of a revival amongst so-called analytic philosophers, after a barren period during which first logical positivism and then ordinary language philosophy

[1] See Immanuel Kant, *Critique of Pure Reason,* trans. N. Kemp Smith (London: Macmillan, 1929), B 22.

[2] See W. V. Quine, 'Two Dogmas of Empiricism', in his *From a Logical Point of View,* 2nd edn. (Cambridge, Mass.: Harvard University Press, 1961).

[3] See Saul Kripke, *Naming and Necessity* (Oxford: Blackwell, 1980).

prevailed, both of them hostile to metaphysical speculation. Analytic philosophers are no longer antipathetic to arguments concerning the nature of substance, the reality of universals or the existence of abstract entities. So we need to understand what can legitimate such inquiries and what epistemological status their conclusions can justifiably lay claim to.

As a preliminary, we need to fix upon some reasonably uncontentious characterization of what metaphysics should be understood to have as its main concern. Traditionally, metaphysics has been thought of as the systematic study of the most fundamental structure of reality—and, indeed, that is the view of it which I should like to support. Understanding the aim of metaphysics in this way makes defending the possibility of metaphysics a substantial and problematic task, and for that reason one well worth exploring. By contrast, to understand the aim of metaphysics as something less ambitious than this—for instance, as the attempt to analyse our currently accepted ways of talking about what we unreflectively take to be certain general features of the world we live in—would make its justification less difficult, but only at the expense of making metaphysics less interesting and less worth doing. Should metaphysics as traditionally conceived turn out to be impossible, we may still be able to pursue these less ambitious projects; but let us not pretend that in doing so we would be doing anything worth dignifying by the name 'metaphysics'.

I confess that characterizing metaphysics as the systematic study of the most fundamental structure of reality hardly sounds very precise. But I am not offering a *definition,* imprecision in which would indeed be a defect. I do not think it would be at all profitable to pursue a definition of 'metaphysics', because the danger would be that it would be framed in a way which favoured one metaphysical position over others—for instance, in a way which presumed the reality of space, or of causation, when the reality of these things may be denied by some metaphysical systems. A similar defect would attend any attempt to specify the subject-matter of metaphysics by means of a list of topics it supposedly embraces. One has only to look at the highly varied contents of modern textbooks of metaphysics to see how arbitrary such an approach would be. Of course, a consequence of *not* providing an absolutely clear-cut delineation of the province of metaphysics is that metaphysics may not appear clearly distinct from certain other enterprises, such as those undertaken in the name of the empirical sciences. However, although I shall later argue that all empirical science presupposes metaphysics, I do not in fact believe that a clear-cut distinction *should* be made between metaphysical concerns and some of the more theoretical concerns of science. Drawing sharp boundaries in such matters is unhelpful, and is not needed in order to maintain

that metaphysical concerns are sufficiently distinctive to form the core of a relatively independent discipline—one whose intellectual credentials are worthy of exploration. In any case, my hope is that when I come, in due course, to attempt to argue on my own account for the possibility of metaphysics, my conception of the subject-matter and methods of metaphysics will emerge more clearly. In effect, I shall be filling out my preliminary characterization of metaphysics by characterizing metaphysics as the discipline made possible by the sort of defence that I shall offer.

2. How Is Metaphysics Possible?

Before I present that defence, I want to look briefly at some rival answers to the question 'How is metaphysics possible?' which are currently popular in various quarters. Some of these answers are frankly *anti*metaphysical whilst others, in my opinion, downgrade the status of metaphysics to that of something unworthy of the name and are thus covertly antimetaphysical too. An antimetaphysical answer to our question is, then, either one which simply denies that metaphysics, as traditionally conceived, is possible, or else one which defends the possibility of something else under the name of 'metaphysics', while implicitly abandoning the real thing. Other answers which I shall reject do attempt to defend the possibility of something recognizably akin to metaphysics as traditionally conceived, but do so in ways I consider to be unsatisfactory. The four positions which I shall consider—only to reject—I shall call (somewhat tendentiously) *relativism, scientism, neo-Kantianism,* and *semanticism*. These are all 'modern' views, though some obviously have historical precedents. I shall not examine, here, certain more traditional positions—such as 'rationalism' and 'empiricism', as supposedly exemplified by such historical figures as Descartes and Locke—because these were positions developed before Kant raised his momentous question, 'How is metaphysics possible?'

The answer of *relativism*—for instance, in its latest 'deconstructionist' guise—to this question is, quite simply, that metaphysics is *not* possible, because metaphysics is the misbegotten product of western intellectual hubris, the mistaken search for a non-existent 'objective' and 'total' truth, guided by supposedly timeless and universal principles of logic. Truth and reason, according to this view, are culture-bound concepts of strictly limited utility. The notion that there could *be* a 'fundamental structure of reality' for us to discern is deemed absurd and paradoxical, because what we call 'reality' is (supposedly) always just some human construction saturated

by interest-driven interpretation. My reply to antimetaphysical claims of this sort is as follows. First, to the extent that they amount to mere *assertions,* unsupported by reasoned argument, they do not merit serious attention. The fact that their proponents are often contemptuous of the value of reasoned argument itself—this being one of the prime objects of their attack—by no means obliges the defenders of metaphysics to take them seriously. If the relativists wish to decry the notion of reasoned argument as a parochial cultural artefact, then they deny themselves any basis for their own assertions but ingrained prejudice, and we should be content to let them wallow in it if it gives them satisfaction. Secondly, if these claims are alleged to be supported by evidence—for instance, of a sociological or anthropological sort—then it has to be pointed out that in fact such evidence as is available supports nothing so extreme: it does not, and cannot, show that human beings are incapable of escaping from culture-bound and interest-driven conceptions of their world, but at most that they often fail to do so. Indeed, the very fact that*some* human beings have discovered that many human beings fail to do this shows, if it shows anything, that we are not incapable of making such an escape. Thirdly, it is characteristic of the relativist attack on metaphysics that it deliberately distorts what it seeks to denounce. It represents metaphysicians as laying claim to infallible insight into eternal and universal truths, uncoloured by any human perspective. But only the most naive or dogmatic metaphysician would make such bald claims. One of the primary aims of metaphysics is precisely to understand, in some measure, our own relation to the rest of reality, and of necessity it undertakes to do this from the position in which we find ourselves. The fact that we cannot stand outside ourselves to study that relation need not imply that it cannot be studied by us at all.

A second popular response to the question of how metaphysics is possible is to claim that it is so because, to the extent that there is a legitimate province of metaphysical inquiry, it is one entirely catered for by the empirical sciences. On this view, it is these sciences, if anything, that can tell us about the fundamental structure of reality. This being so, there can be no scope for a distinctly 'philosophical' approach to the questions of metaphysics, conceived as an approach different in its methods or objects from those already embraced by the empirical sciences. For instance, if there are fundamental questions to be raised about the existence and nature of space and time, it seems to follow that these can only be answered by such sciences as cosmology and quantum physics. There can be no room for 'armchair' philosophical speculation or 'conceptual analysis' as routes to addressing such questions. To the extent that metaphysical questions are genuinely answerable, it will be said that they are being

answered by people working in departments of physics, not by people working in departments of philosophy.

A view like this is often to be found expressed, either explicitly or in a barely disguised form, in modern books of popular science, designed to convey to a lay audience the arcane deliverances of the latest theories in physics—theories claiming, for instance, that space 'really' has many more than three dimensions or that the universe is the result of a quantum fluctuation in the vacuum and so came from 'nothing'. In a subtler form, a devotion to *scientism*—as I call the doctrine that such legitimate metaphysical questions as there are belong to the province of the empirical sciences—is even to be found, ironically enough, in many departments of philosophy. A version of it has there become dignified under the title of 'naturalized epistemology'. This is the view that all human knowledge—including any metaphysical knowledge that we may lay claim to—is a product of our biological nature as cognizing animals, and is hence to be studied by the methods of the life sciences, including psychology and evolutionary theory. Thus we see a bizarre situation arising in which popularizing scientists denounce the pretensions of philosophers while many of the people whom they are criticizing have in fact already abdicated any claim to know better than the scientists how to address the questions of metaphysics.

In my opinion, both types of devotee of scientism—those drawn from the ranks of scientists and those drawn from the ranks of *soi-disant* philosophers—exhibit a blinkered dogmatism which is the very antithesis of genuine philosophy. Both fail to see that science *presupposes* metaphysics and that the role of philosophy is quite as much normative as descriptive—with everything, including science, coming within its critical purview. Scientists inevitably make metaphysical assumptions, whether explicitly or implicitly, in proposing and testing their theories—assumptions which go beyond anything that science itself can legitimate. These assumptions need to be examined critically, whether by scientists themselves or by philosophers—and either way, the critical philosophical thinking that must be done cannot look to the methods and objects of empirical science for its model. Empirical science at most tells us what *is* the case, not what *must* or *may be* (but happens not to be) the case. Metaphysics deals in *possibilities*. And only if we can delimit the scope of the *possible* can we hope to determine empirically what is *actual*. This is why empirical science is dependent upon metaphysics and cannot usurp the latter's proper role.

A third response to our question 'How is metaphysics possible?' is, unlike the first two, genuinely philosophical, drawing its inspiration from Kant—whence I call it *neo-Kantian*. According to this view, metaphysics

does not and cannot tell us anything about objective reality 'as it is in itself', if indeed the notion of such a reality even makes sense. But it *can* tell us something about certain fundamentally necessary features of our *thought* about reality. For instance, it may be able to establish that we must think of the objects of perception as being situated in space and time and as being related causally to one another—perhaps on the grounds that, as Kant himself held, a recognition of ourselves as self-conscious beings whose thoughts and experiences are ordered in time requires us to make reference to such a world of perceptible objects. By opting for a less ambitious aim, it is hoped that the possibility of a suitably modest metaphysics may be secured. However, such a position is fatally flawed, if its intention is to render 'metaphysical' claims legitimate by construing them as not venturing to speak of how things really are, as opposed to how we must *think* of them as being. For *we,* if we are anything, are part of reality ourselves, as are our thoughts, so that to purport to make claims about allegedly necessary features of *our thoughts* while simultaneously denying that anything is being claimed about the nature of 'reality' is to contradict oneself. Trying to make metaphysics safe by drawing in its horns in this way is an exercise which is doomed to failure.

Still more unsatisfactory is any attempt to legitimate metaphysics by enfeebling it yet further, by construing its claims as being merely descriptive of a conceptual scheme we find ourselves possessed of, without even purporting to establish the inevitability of that scheme. Metaphysical inquiry must at least be critical, so that to the extent that it deals in 'concepts' it cannot rest content to describe or analyse the concepts that we happen to have, but should, rather, seek to revise and refine these concepts where necessary.[4] But the point of such revision, if it has a point, can only be to render our concepts truer to reality—ensuring the mere internal consistency of a conceptual scheme is too modest an aim, because many mutually incompatible schemes could equally possess this feature.[5] If it is suggested that choice between such schemes can be rationally made by selecting what does least violence to our 'natural' beliefs or 'intuitions', leaving us in a condition of 'reflective equilibrium', then again it must be objected that an exercise of this sort does not deserve to be dignified by the name 'metaphysics', because we have no right to suppose that our natural beliefs reflect the fundamental structure of reality. It is one of the few

[4] By implication, I mean here to challenge both P. F. Strawson's distinction between 'descriptive' and 'revisionary' metaphysics and his rejection of the latter: see his *Individuals: An Essay in Descriptive Metaphysics* (London: Methuen, 1959), 9 ff.

[5] I do not share Donald Davidson's scepticism about this, as expressed in 'On the Very Idea of a Conceptual Scheme': see his *Inquiries into Truth and Interpretation* (Oxford: Clarendon Press, 1984).

virtues of scientism that it recognizes this fact, because it recognizes that our natural beliefs are products of evolutionary processes which are geared to the practical demands of survival rather than to the theoretical demands of metaphysical truth.

The fourth and final response I wish to criticize is what I call *semanticism*. This is the view, notably subscribed to by Michael Dummett, that metaphysical questions can in principle be resolved by recourse to (and *only* by recourse to) the theory of *meaning*.[6] Thus, whether we are entitled to take a 'realist' view of some area of discourse, such as talk about set theory, or quantum physics, or the past, is to be decided by whether or not an adequate theory of meaning for that area of discourse will assign 'realist' truth-conditions to its sentences, that is, truth-conditions which reflect a commitment to the principle of bivalence as far as those sentences are concerned. In fact it seems that semanticism of this sort does not differ fundamentally from what I have been calling neo-Kantianism, because its proponents such as Dummett regard the theory of meaning as providing the only legitimate basis for a theory of the structure and content of thought.[7] Thus semanticism only gives a linguistic dress to a kind of approach to metaphysics which we have already considered and rejected. If anything, semanticism threatens to reduce metaphysics to something even more parochial, by making answers to its questions turn on the linguistic practices of an arbitrarily chosen human community. No doubt the semanticist will claim that the features of the theory of meaning which are pertinent to metaphysical concerns are 'deep' ones, which transcend differences between different human speech communities. But what sort of basis would such a claim have? If merely anthropological, we are back to scientism or to some sort of relativism. Nor can the theory of meaning itself determine what counts as 'deep'.

The basic problem with semanticism is that, to the extent that one can legitimately appeal to considerations of meaning in order to answer metaphysical questions, the considerations in question must not be merely ones of what we *do* mean—for there is no guarantee that we mean anything very precise or coherent by what we saybut, rather, they must be considerations of what we *should* mean. This is to reiterate the point that metaphysics must be critical and potentially revisionary of our currently accepted concepts and beliefs. However, questions of what we *should* mean cannot be answered wholly from within the theory of meaning, but require recourse to independent metaphysical argument. An illustration

[6] See Michael Dummett, *The Logical Basis of Metaphysics* (London: Duckworth, 1991), Introduction.

[7] See Michael Dummett, *Origins of Analytical Philosophy* (London: Duckworth, 1993), ch. 13.

of this is provided by the debate over what constitutes an *object*—a metaphysical debate if ever there was one, and one to which we shall return in detail in Chapter 2. The semanticist will say, typically, that an object is to be understood as a possible referent of a singular term, and will contend that the notion of a singular term is one which can be explicated in a way which does not depend on a prior notion of what constitutes an object—for instance, by reference to the characteristic logical behaviour of singular terms as exhibited by the patterns of valid inference sustained by sentences containing them.[8] However, it is readily apparent that our existing language contains expressions which qualify as singular terms by any such criterion and yet which it would be extravagant to suppose make reference to *objects* of any sort. An example would be a definite description such as 'the grin on John's face'. Ordinary language even gives the appearance of *quantifying* over such spurious 'objects', as in a sentence like 'John is wearing a broad grin'. Of course, such a sentence is satisfactorily paraphrasable by one avoiding a quantifier, namely, 'John is grinning broadly'. But paraphrase is a symmetrical relation, so that there are no resources wholly within one's theory of meaning for the language wherewith to decide which of these two sentences is to be regarded as more accurately reflecting the ontology of its speakers. Much less does such a theory enable us to decide what an 'object' is, or what objects the world really contains. These questions can only be addressed by independent metaphysical argument, if they can be legitimately addressed at all.[9] The linguistic, or semanticist, approach to questions of metaphysics inevitably leads to a doctrine of extreme ontological relativity, as some of its proponents have realized.[10] In this guise, therefore, it collapses into a version of the first approach considered above, which I called relativism.

3. Metaphysical Possibility and the Possibility of Metaphysics

The time has now come for me to offer my own answer to the question of whether, and if so how, metaphysics is possible. My view is that it is indeed

[8] See Michael Dummett, *Frege: Philosophy of Language,* 2nd edn. (London: Duckworth, 1981), ch. 4. See also Crispin Wright, *Frege's Conception of Numbers as Objects* (Aberdeen: Aberdeen University Press, 1983), 53 ff., and Bob Hale, *Abstract Objects* (Oxford: Blackwell, 1987), ch. 2.

[9] I explain this more fully in my 'Objects and Criteria of Identity', in Bob Hale and Crispin Wright, eds., *A Companion to the Philosophy of Language* (Oxford: Blackwell, 1997), and in Chapter 2 below.

[10] I have in mind here what W. V. Quine says in 'Speaking of Objects' and 'Ontological Relativity': see his *Ontological Relativity and Other Essays* (New York: Columbia University Press, 1969).

possible: that is, I hold that it is possible to achieve reasonable answers to questions concerning the fundamental structure of reality—questions more fundamental than any that can be competently addressed by empirical science. But I do not claim that metaphysics *on its own* can, in general, tell us what *there is*. Rather—to a first approximation—I hold that metaphysics by itself only tells us what there could be. But given that metaphysics has told us this, experience can then tell us which of various alternative metaphysical possibilities is plausibly true in actuality. The point is that although what is actual must for that very reason be possible, experience alone cannot determine what is actual, in the absence of a metaphysical delimitation of the possible. In short, metaphysics itself is possible—indeed necessary—as a form of rational human inquiry because metaphysical possibility is an inescapable determinant of actuality. Stated in this highly abstract and condensed way, my answer may appear obscure and even gnomic, so my task in what remains of this chapter will be to unfold its implications.

So far I have begun to forge a link between the possibility of metaphysics and the notion of metaphysical possibility. The idea is that the realm of metaphysical possibility is a genuine one which needs to be explored, or at least assumed, before any claim to truth in actuality can be legitimated by experience. And this is a realm which cannot, of course, be explored solely by the methods of the empirical sciences, precisely because they merely purport to establish what is true in actuality on the basis of experience, and hence presuppose metaphysics. But it may be objected here that the only sort of possibility which the empirical sciences presuppose is *logical* possibility—and that this can be established without recourse to a distinct discipline of metaphysics, because logical possibility is simply a matter of compliance with the a priori laws of logic. In short, it may be urged that the only precondition which needs to be met by the theories of empirical science, before they are tested in the court of experience, is that they should not entail a logical contradiction. However, in the first place, the deliverances of experience itself can only be assessed in the light of metaphysical possibility and, in the second, such possibility is not simply tantamount to mere logical possibility as characterized a moment ago. I shall develop the latter point more fully in the next section when I discuss how metaphysical possibility may be defined, but some preliminary observations concerning it are appropriate here.

The logical possibility of a proposition or set of propositions, as characterized a moment ago, is simply a matter of its (or their) not entailing a logical contradiction. But metaphysical possibility is something quite distinct from this. In the first place, it is not—or, at least, is not merely—the possibility of a *proposition* (or set of propositions), but rather the

possibility of a *state of affairs* (one which is *representable,* no doubt, by a proposition): and so in this sense it is a 'real', or *de re,* possibility. The notion of a state of affairs, of course, is itself a metaphysical notion, just one of a large family of such notions, some more basic than others. Other notions in this family are the notions of an *object,* a *property,* a *relation,* an *individual,* a *kind,* a *part,* a *substance, existence, identity, instantiation,* and indeed *possibility,* along with its correlative, *necessity.* Some of these notions are definable in terms of others, though precisely how they should be defined is itself a matter for metaphysical debate. Thus—as we shall see more fully in Chapter 6—a *substance* might be defined to be an *object* which does not *depend* for its *existence* upon any other *object* (where dependency is defined in terms of *necessity*).[11] These metaphysical notions are not purely 'logical' notions: they are *ontological.*[12] They concern *being and its modes,* whereas logic, properly understood, does not concern being in general but, rather, the formal properties of and relations between propositions (which constitute only a small part of what there is). Moreover, these metaphysical notions are in a certain sense *transcendental,* in that they are not derivative from experience but are on the contrary to be invoked in construing what experience reveals of reality. Clearly, they are closely related to the *categories* of Aristotle and Kant, but my account of them crucially differs from Kant's (and is thereby closer to Aristotle's) in that I regard them as being genuinely applicable to reality and not merely to our *thought* about reality. They are not categories of thought, but categories of *being.* This is not, however, to say that the applicability of a given category to reality can, in general, be determined wholly a priori—only its *possible* applicability may be thus determinable. For instance, we may not be able to establish a priori that there actually are any *substances,* only that there *could* be. Only by recourse to experience, perhaps, can we have reason to believe that there *are.*

Of course, the 'semanticist' will claim that these 'categories' are just reflections of, and entirely derivative from, semantico-syntactic features of the natural languages which we happen to employ—the notion of an 'object' corresponding to that of a singular term, the notion of a 'property' corresponding to that of a predicate, and so on. But I have already explained why I consider this view to invert the proper order of explanation. Such correspondences of this sort as may exist do so because any language which has evolved as a means to expressing truths about reality

[11] I examine various definitions along these lines in my 'Ontological Dependency', *Philosophical Papers,* 23 (1994), 31–48, and in Chapter 6 below.

[12] Compare Barry Smith, 'Logic, Form and Matter', *Proceedings of the Aristotelian Society,* supp. vol. 55 (1981), 47–63.

must embody some recognition, however partial and distorted, of the metaphysical categories in terms of which the fundamental structure of reality is to be articulated. Since there is room for debate about that structure, it is unsurprising that different natural languages reflect some metaphysical categories more prominently than others. Such differences reflect, in all probability, differences in the tacitly held metaphysical beliefs of different human speech communities. But although linguistic structure can perhaps serve to reinforce and entrench those beliefs, the 'Whorfian' view that linguistic structure is the source of them is, I consider, quite unsustainable.[13]

I began to talk about metaphysical categories in the course of introducing the notion of metaphysical possibility and urging that it differs from that of mere logical possibility. The metaphysical possibility of a state of affairs is not determined simply by the absence of contradiction in the propositions used to describe it—though, of course, such an absence of contradiction is a minimal requirement of metaphysical possibility. Consider, thus, an example *par excellence* of a question of metaphysical possibility: the question of whether there could be vague objects, that is, objects for which there could fail to be a fact of the matter as to their identity or diversity in certain circumstances. (We shall return to this and related questions at much greater length in Chapter 3.) Now, it is true enough that a number of philosophers, notably Gareth Evans, have argued *against* this possibility by attempting to derive a contradiction from the supposition that a given identity statement is of indeterminate truth-value, a supposition which may be expressed by a proposition of the form '$\nabla(a = b)$'.[14] As it happens, I consider that this argument is flawed, and consequently that a contradiction *cannot* be derived from the supposition in question.[15] It doesn't follow, however, that I must consider the existence of vague objects to be metaphysically possible. Indeed, I have grave doubts about this, because—as I shall explain in Chapter 2—I consider that the only metaphysically defensible notion of an *object* is precisely that of an entity which possesses determinate identity-conditions.[16] Thus, although I have, elsewhere, referred to the domain of subatomic particles as providing putative examples of 'objects' whose diachronic

[13] See *Language, Thought and Reality: Selected Writings of Benjamin Lee Whorf,* ed. J. B. Carroll (Cambridge, Mass.: MIT Press, 1956). For criticism of Whorf's view, see Michael Devitt and Kim Sterelny, *Language and Reality* (Oxford: Blackwell, 1987), chs. 10 and 12.

[14] See Gareth Evans, 'Can There Be Vague Objects?', *Analysis,* 38 (1978), 208.

[15] See my 'Vague Identity and Quantum Indeterminacy', *Analysis,* 54 (1994), 110–14, and also Chapter 3 below.

[16] See also my 'The Metaphysics of Abstract Objects', *Journal of Philosophy,* 92 (1995), 509–204, and Chapters 2 and 3 below.

identity may, in certain circumstances, be vague,[17] at a deeper level I am sympathetic to the view that what the relevant empirical evidence shows is that it is wrong to think of electrons and the like as really being *objects* at all. (Let it not be supposed, however, that this is just a verbal issue about the meaning of a word, 'object': the deeper point is that a satisfactory system of metaphysics needs to mark a fundamental division between those entities that do, and those that do not, possess determinate identity-conditions—and appropriate use of the term 'object' serves precisely this purpose.) Thus we see that the validity of a claim that a certain state of affairs is metaphysically possible does not simply hinge on the question of whether or not the propositions used to describe it entail a contradiction, but rather on the question of whether acceptable metaphysical principles and categories permit the existence of that state of affairs. And this is a matter for distinctly metaphysical debate. A general comparison might be drawn here with questions of what is *morally* possible or permissible, which again cannot be settled purely by considerations of logic since at some stage distinctly moral notions must be brought in to play a substantive role in any argument for the moral permissibility of a given state of affairs.

Let us look at another group of examples in order to reinforce this conclusion. Metaphysicians have long debated about the possibility of change and the reality of time—and we too shall be exploring these questions in some depth in Chapters 4 and 5. However, they are neither purely empirical nor purely logical questions. How we should conceive of time is itself a metaphysical question—a question of how, if at all, the notion of time is to be related to more fundamental metaphysical notions, including the categories. For instance, one view (the 'Aristotelian' view) is that time is the dimension in which alone a substance can receive contrary qualities, and this, if correct, would seem to imply at least three things: that substances must be able to persist identically through qualitative change, that there cannot be time without change, and that the unity of time rests upon the persistence of substances. Although I happen to agree with these claims,[18] I readily concede that they are controversial. But what I want to insist on just here is, first, that these issues are potentially capable of resolution through rational debate, and, secondly, that the kind of argument involved in such debate is distinctly metaphysical. Showing that time is *metaphysically* possible is not just a matter of demonstrating the logical

[17] See again my 'Vague Identity and Quantum Indeterminacy', and Chapter 3 below.

[18] See my 'Substance, Identity and Time', *Proceedings of the Aristotelian Society,* supp. vol. 62 (1988), 61–78, and Chapter 5 below.

consistency of temporal discourse—by, for example, rebutting McTaggart's arguments to the contrary[19]—nor is it simply a matter of formulating a consistent *physical* theory of time, along the lines of, say, Einstein's special theory of relativity. Einstein's theory makes certain fundamental claims *about* time—for instance, that simultaneity is relative and that the velocity of light cannot be surpassed—but that it does indeed concern time, and that in having such a concern it concerns something whose reality is *possible,* are metaphysical questions which no merely scientific theory of this sort can settle.

While on the subject of time and change, here is one final, and quite specific, example which will serve to illustrate my general point. The example concerns the 'possibility' of *one thing's becoming two,* without thereby ceasing to exist—the intended implication being that in such a situation we would supposedly have, at a later time, two numerically distinct things which were formerly numerically identical. Although, very arguably, one can describe such a situation without logical contradiction, metaphysical reasoning appears to rule it out, on the grounds that no change in the objects concerned could occur at an appropriate time to effect their separation. (We are assuming, then, that the separation could not simply occur *uncaused*—itself a metaphysical assumption.) For if the putatively effective change were to occur prior to the supposed separation, it would be *too early*—since then it would have to affect both of the supposed objects in exactly the same way, they being, *ex hypothesi,* identical at that time. On the other hand, if the change were to occur *subsequently* to the supposed separation, it would obviously occur too late to have caused it, barring the possibility of backward causation. (This is not, of course, to deny that one thing can become two new things by ceasing to exist, nor that one thing can continue to exist while giving birth to another, as in ordinary cases of division or fission: it is only to deny that two things which, allegedly, were formerly *one and the same* can have been made to become separate and thereby non-identical.)

4. The Nature of Metaphysical Necessity

The time has now come for me to present a more rigorous characterization of metaphysical possibility than is provided by the illustrative examples supplied above. Of course, notions of possibility and necessity are interdefinable. With that in mind, I shall approach the task in hand via

[19] See my 'The Indexical Fallacy in McTaggart's Proof of the Unreality of Time', *Mind,* 96 (1987), 62–70, and Chapter 4 below.

the notion of metaphysical *necessity*. Here, then, is the question that I should like to focus on for the time being: what exactly is *logical* necessity and how, if at all, does it differ from metaphysical necessity? For so far I have been implying that metaphysical necessity is quite distinct from logical necessity—and, indeed, in an important sense I think that this is true—but, at the same time, I must now acknowledge that there is one perfectly acceptable conception of 'logical' necessity which represents it as either coinciding with or embracing metaphysical necessity. It will be seen, however, that this acknowledgement does not in any way undermine the general thrust of my remarks in the previous section.

In the previous section I was content to characterize logical possibility somewhat vaguely in terms of compliance with the laws of logic, with logical necessity understood correspondingly. But in fact one can distinguish three different grades of logical necessity, as follows. First there is the *strictly* logically necessary—that which is true in virtue of the laws of logic alone. Secondly there is the *narrowly* logically necessary—that which is true in virtue of the laws of logic together with definitions of non-logical terms. And thirdly there is the *broadly* logically necessary—that which is true in every logically possible world, that is, in every possible world in which the laws of logic hold true. Now, one might very reasonably contend that this last grade of logical necessity is in fact coextensive with *metaphysical* necessity—indeed, that these are just two different names for the same thing. In characterizing 'broadly' logical necessity in this way and associating it with the notion of metaphysical necessity, I am just following in an already well-established tradition[20]—although I am sensible of the danger that this tradition may lead incautious philosophers to overlook the very division between logic and metaphysics which I was concerned to identify in the previous section. Some philosophers, of course, also speak of 'conceptual' necessity as being synonymous with some kind of logical necessity. I can agree with this, so long as the conceptually necessary is identified with what I have just called the *narrowly* logically necessary. For I take it that the 'conceptually' necessary is that which is true solely in virtue of concepts together with the laws of logic.

Of course, what the laws of logic *are* is a matter for dispute, but we need not go into that here. There are some fairly uncontroversial candidates, such as the law of non-contradiction: for any proposition *P,* it is not the case both that *P* and that not-*P*. Thus, 'It is not the case both that Ferdy

[20] See, for example, Alvin Plantinga, *The Nature of Necessity* (Oxford: Clarendon Press, 1974), 2, and Graeme Forbes, *The Metaphysics of Modality* (Oxford: Clarendon Press, 1985), 2. As we shall shortly see, however, some philosophers—such as Bob Hale, in a paper to be discussed in the next section—do not follow in this tradition.

is a female fox and that Ferdy is not a female fox' is *strictly* logically necessary, because it is an instance of that law. By contrast, 'It is not the case both that Ferdy is a vixen and that Ferdy is not a female fox' is only *narrowly* logically necessary, in my terms, because it can only be turned into an instance of that law by drawing on the definition of 'vixen', which is a non-logical term. (What *is* a logical term is, of course, once again open to dispute, but no sensible account will treat 'vixen' as a logical term.)

What about an example of *broadly* logical necessity—more specifically, an example of such a necessity which is not also either a strictly or a narrowly logical necessity? A well-known and plausible candidate would be 'Water is H2O'. It may be objected that this proposition cannot be true in every logically possible world, because water does not exist in every such world. However, this difficulty can be circumvented fairly easily, in one way or another: for instance, one can distinguish between 'strong' and 'weak' necessity, saying that a proposition is *weakly* necessary (in the broadly logical sense) just in case it is true in every logically possible world in which its referring expressions are non-empty. Then, assuming that 'Water is H2O' is to be analysed as an identity statement flanked by two referring expressions or names, it will turn out to be only weakly necessary (in the broadly logical sense). Notice, though, that if 'Water is H2O' is analysed instead as meaning 'For any *x*, *x* is water if and only if *x* is H2O', the difficulty goes away by itself, because 'Water is H2O' then turns out to be vacuously true in all worlds in which water doesn't exist (that is, in which nothing is water and in which, by the same token, nothing is H2O). What is crucial, however, is that it is not *in virtue of the laws of logic plus definitions alone* that 'Water is H2O' is true in all logically possible worlds (or, alternatively, in all such worlds in which its referring expressions are non-empty)—and so it is neither strictly nor narrowly logically necessary, as I use these terms. Other possible candidates for the status of broadly logically necessary truths which are neither strictly nor narrowly logically necessary would be 'Hesperus is Phosphorus', 'God exists', 'Nothing is both red and green all over at the same time', and 'This pain is mine'.

So, in virtue of *what* is 'Water is H2O' broadly logically necessary? Why, in virtue of the *nature of water*! Not, thus, in virtue of the laws of logic together with the *concepts* or *definitions* of water and H2O. It seems perfectly appropriate, then, to call this kind of necessity *metaphysical* necessity, since its ground is ontological rather than formal or conceptual. This might be a reason, indeed, for reserving the term 'metaphysical necessity' for those broadly logical necessities which are *not* also narrowly or strictly logically necessary. We could then also legitimately say, as many philosophers do, that it is a frequent (though not necessarily universal) feature of

metaphysical necessities that they are not knowable a priori—in contrast with strictly and narrowly logical necessities, which characteristically *are* knowable a priori. However, these epistemological and semantic matters are not our real focus of concern just here. Whether to define 'metaphysical necessity' as synonymous with 'broadly logical necessity' or as synonymous with 'broadly logical necessity which is neither strictly nor narrowly logical necessity' is ultimately just a matter for decision. Either definition will do, provided we stick to it. However, for the sake of simplicity and out of respect for the usage of other philosophers, I shall adopt the first option. But I should just emphasize that although I happily concede that the metaphysical necessity of a proposition such as 'Water is H2O' (or of the state of affairs which that proposition represents) is not knowable a priori—because it rests upon the nature of water, which is not thus knowable—I still want to insist that, as I put it in the previous section, experience alone cannot determine what is actual, in the absence of a metaphysical delimitation of the possible. Typically, such a delimitation will appeal to the metaphysical *categories,* which are indeed knowable purely a priori, unlike *natural kinds* such as water. (This is a point which I shall develop in much greater detail in Chapter 8.)

5.Hale's Dilemma

It has to be acknowledged that not all philosophers are happy with the notion of metaphysical necessity. Thus, in a recent paper, Bob Hale presents what appears to be a serious dilemma for the friends of metaphysical necessity, based on an appeal to what he calls the generalized form of McFetridge's Thesis, that is, the thesis that if it is logically necessary that *P,* then there is no sense of 'possible' in which not-*P* is possible.[21] Hale sees the dilemma as arising as follows:

> the argument for McFetridge's Thesis, if sound, does establish that if it is logically necessary that *p,* then it is in no sense possible that not-*p,* and so, in particular, that it is not metaphysically possible that not-*p,* i.e. that it is metaphysically necessary that *p*. But then either the converse entailment holds quite generally, or it does not. If not, then it can be metaphysically necessary that *p* but logically possible that not-*p,* so that metaphysical necessity is not, after all, absolute. If, on the other hand, whatever is metaphysically necessary is also logically necessary, then even if we have two notionally distinct kinds of necessity, both of them absolute,

[21] See Bob Hale, 'Absolute Necessities', in James E. Tomberlin, ed., *Philosophical Perspectives,* 10: *Metaphysics* (Oxford: Blackwell, 1996), 98. See also Ian McFetridge, 'Logical Necessity: Some Issues', in his *Logical Necessity and Other Essays* (London: Aristotelian Society, 1990).

> they coincide in extension. Neither alternative is—or so it seems—congenial to the friends of metaphysical necessity. (p. 98)

However, setting aside the question of the soundness of Hale's argument for McFetridge's Thesis, I should like to query his reasons for thinking that each of the horns of the supposed dilemma should be uncongenial to the friends of metaphysical necessity. At the root of my objections is a dissatisfaction with Hale's conception of logical necessity.

Hale seems to be following orthodoxy in distinguishing between two kinds of logical necessity: 'narrowly or strictly logical necessity' and 'broadly logical necessity':

> We may distinguish between narrowly or strictly logical necessity and broadly logical necessity; I take the former to be a special case of the latter, and make no distinction between [the latter] and conceptual necessity. Hereafter, when I speak of logical necessity without further qualification, it is broadly logical necessity that I intend. (p. 94)

However, while this terminology is familiar, Hale's interpretation of it is idiosyncratic. For Hale, as we see, quite explicitly identifies 'broadly logical necessity' with 'conceptual necessity', whereas the orthodox tradition—exemplified by Plantinga and Forbes and by myself in the previous section—understands 'broadly logical necessity' to mean 'truth in all logically possible worlds': and the latter *cannot* be identified with 'conceptual necessity' because it is not, as a perfectly general rule, knowable a priori. Indeed, according to the tradition, as I understand it, 'metaphysical necessity' just *is* 'broadly logical necessity' as just defined, or at least is a sub-category of the latter. Hale himself remarks, at one point, that

> supposedly metaphysically necessary truths are typically held to be knowable *only a posteriori,* while [broadly] logical necessities are . . . knowable *a priori*—so there cannot, on pain of contradiction, be extensional coincidence [between them]. (pp. 98–9)

And this is more or less correct—on his understanding of the notion of broadly logical necessity. But it is *not* correct if, as the orthodox tradition has it, broadly logical necessity is identified with truth in all logically possible worlds.

Now let us see how these considerations affect the cogency of Hale's attack on the notion of metaphysical necessity. I shall set aside any doubts about his argument for McFetridge's Thesis, because I accept that, on *his* understanding of what constitutes 'broadly logical necessity', the thesis is nearly enough correct. I shall focus, then, on the dilemma that this is supposed to create for the friends of metaphysical necessity. The first horn of the dilemma is supposed to arise if the metaphysician allows that it can be

metaphysically necessary that *P* and yet logically possible that not-*P*—for then, Hale says, it must be conceded that metaphysical necessity is not 'absolute' but 'relative'. Now, whether the metaphysician should indeed allow this depends on whether we understand the notion of 'broadly logical possibility' in Hale's sense or in the orthodox sense, that is, as being equivalent to conceptual possibility or as being equivalent to truth in some logically possible world. But, setting that matter aside for the moment, what is supposed to be the *problem,* for the friends of metaphysical necessity, about conceding that metaphysical necessity is not 'absolute' but 'relative', in Hale's terms?

At this point we need to understand exactly what Hale means by 'relative' necessity. This is what he says:

> By saying that a notion of necessity—φ-necessity—is *relative* I mean that there is some body of statements Φ such that to claim that it is φ-necessary that *p* is to claim no more and no less than that it is a logical consequence of Φ that *p*. (p. 93)

According to Hale, then, the metaphysician who concedes that metaphysical necessity is relative must concede that to claim that it is *metaphysically* necessary that *P* is to claim no more and no less than that, for some body of statements *M,* it is a logical consequence of *M* that *P.* But why should this not be congenial to the friends of metaphysical necessity? I see no harm whatever in conceding the point in question. No doubt there is some set of true statements or propositions *M*—roughly, the ones that characterize the 'natures' of all the entities that populate the world—such that every metaphysically necessary statement or proposition *P* is a logical consequence of *M* (that is, could be deduced from *M*). Thus 'Water is H2O' would be a consequence of *M,* in virtue of *M*'s including a characterization of the nature of water. Of course, in this case, at least, the consequence is a trivial one, since the best way to characterize the nature of water is in terms of the very proposition in question, 'Water is H2O'. However, we should not be tempted to think that any of this implies that metaphysical necessity has a status akin to, say, that of *physical* necessity. For—by my account, at least—every statement in *M* will itself express a broadly logical necessity, that is, will be true in every logically possible world. So it is not as though we are saying that 'It is metaphysically necessary that *P*' is *analysable* as meaning, or *definitionally equivalent to,* '*P* is a consequence of *M*' (where *M* is defined as being something like the set of all truths about the natures of all entities). For we cannot define the notion of something's 'nature' independently of the notion of metaphysical necessity. (Moreover, we already *have* a definition of 'metaphysical necessity', in terms of truth in all logically possible worlds, and this definition doesn't mention 'natures'. Of course, it may be debated how illuminating

our definition ultimately is—and that will depend on how illuminating one takes talk about 'possible worlds' to be. I shall not, however, pursue that issue just now, though we shall return to questions concerning possible worlds in later chapters.)

So what I want to say is that the friends of metaphysical necessity can quite happily concede that, technically speaking, metaphysical necessity qualifies as a species of 'relative' necessity, in Hale's terms. Here I observe that, concerning the 'relativity' of 'relative' necessity, Hale remarks:

> The relativity of φ-necessity consists in the fact that, whilst no φ-necessary statement can be false, provided that all the members of Φ are true, it is not excluded that there are other senses of 'possible' in which the members of Φ may be false. (p. 93)

But, whereas in the case of physical necessity it is clear that members of the relevant set Φ may be false in some logically possible worlds, this is *not* so, by my account, in the case of metaphysical necessity. Metaphysical necessity, by my account, is as 'hard' as any kind of necessity could be.

Why, however, does *Hale* think that conceding the relativity of metaphysical necessity should be uncongenial to the friends of metaphysical necessity? For the following reason:

> To accept that metaphysical necessity is not absolute is to acknowledge that while it is, say, metaphysically necessary that heat is mean kinetic energy of molecules, there are possible worlds—logically possible worlds—in which this is not so [and yet] . . . what the metaphysicians wanted to maintain is that, given that heat is mean kinetic energy of molecules, there are no possible worlds in which heat is not so constituted (p. 98)

What Hale is saying here is that if metaphysical necessity is not 'absolute', then it can be metaphysically necessary that *P and yet still be the case that not-P is true in some logically possible world.* But Hale is not at all entitled to claim this, given that what he means by 'broadly logical possibility' is *conceptual possibility,* rather than (as the orthodox tradition has it) *truth in some logically possible world.* All that Hale is entitled to claim, on his own terms, is that if metaphysical necessity is not 'absolute', then it can be metaphysically necessary that *P and yet still be the case that not-P is conceptually possible.* But to concede the latter should be by no means uncongenial to the friends of metaphysical necessity. For instance, they should quite happily allow that, while it is metaphysically necessary that water is H2O, it is none the less *conceptually* possible that water is not H2O—for the very point that the metaphysicians want to make is that the necessity of that identity is grounded in the *nature of water* rather than in our *concepts* of 'water' and 'H2O'.

Having disarmed the first horn of Hale's supposed dilemma, let us turn

to the second, which is supposed to arise if the metaphysician contends that logical and metaphysical necessity are extensionally coincident. What is supposed to be the problem in this case? This is what Hale says:

> accepting that metaphysical and logical necessity are extensionally coincident is scarcely less unattractive. How *could* it be held that e.g. the identity of heat with mean kinetic energy of molecules is *logically* necessary? Furthermore, such supposedly metaphysically necessary truths are typically held to be knowable *only a posteriori,* while logical necessities are . . . knowable *a priori*—so there cannot, on pain of contradiction, be extensional coincidence. (pp. 98–9)

Once again we have a ready answer to Hale's worries. Certainly, the metaphysician should not concede that metaphysical necessity coincides with what *Hale* calls 'broadly logical necessity', that is, with *conceptual* necessity, but he can happily allow that it coincides with what the orthodox tradition understands by 'broadly logical necessity', namely, *truth in all logically possible worlds*—for, as I pointed out earlier, the latter is not, as a perfectly general rule, knowable a priori.

To conclude: I do not believe that Hale's arguments pose any real threat to the friends of metaphysical necessity. McFetridge's Thesis is correct (or nearly enough so), but innocuous, if construed as a thesis concerning *conceptual* necessity. The metaphysician should be prepared to agree that metaphysical necessity is not 'absolute', in *Hale's* terms, in as much as it can be metaphysically necessary that *P* and yet *conceptually* possible that not-*P*. But this doesn't imply that the metaphysician must agree that it can be metaphysically necessary that *P* and yet not-*P* be *true in some logically possible world*. For what is crucially overlooked by Hale is the fact that to say that not-*P* is conceptually possible is not equivalent to saying that not-*P* is true in some logically possible world. In a perfectly good sense, then, metaphysical necessity *is* 'absolute'—namely, in the sense that if *P* is metaphysically necessary, there is no logically possible world (and so no world whatever) in which not-*P* is true.

Our original question (first posed in section 4) was: what is logical necessity and how, if at all, does it differ from metaphysical necessity? My answer is: the term 'logical necessity' is multiply (three-way) ambiguous and in one, but only one, of its senses can it be said to coincide in meaning with the term 'metaphysical necessity'. A proposition is necessary in this sense just in case it is true in every logically possible world, that is, in every world in which the laws of logic hold true. This is, in a perfectly good sense, as 'hard' a kind of necessity as there can be—even though it is consistent with saying that a proposition *P* is necessary in this sense to say that not-*P* is none the less possible in another sense, namely, in the sense that the truth of not-*P* is not ruled out by the laws of logic together with any

non-logical concepts which *P* involves. This kind of necessity is not, in many cases, knowable a priori, precisely because it is not, in many cases, grounded in logic and concepts but, rather, in the 'natures' of things.

6. Logic and Metaphysics

I say above that *P* is 'strictly' logically necessary just in case *P* is true 'in virtue of the laws of logic alone'. However, this may seem to raise the spectre of a regress problem of the kind which Hale himself investigates towards the end of his paper. To say that *P* is true in virtue of the laws of logic alone is, seemingly, to say that *P* either *is* a law of logic itself, or else *follows* from—is a logical consequence of—such laws. But, in the latter case, what about the status of the proposition stating that *P* is a logical consequence of the laws? Should we regard that proposition, too, as being strictly logically necessary? If so, then we must say either that that proposition is itself one of the laws, or else that it is a consequence of those laws. And in the latter case, we shall then have to consider the yet further proposition that the proposition in question is a consequence of the laws—and so it goes on.

Is there really a problem lurking here? Let us consider a specific case of a strictly logically necessary proposition, such as 'It is not the case both that Ferdy is a female fox and that Ferdy is not a female fox'. This is not itself a law of logic, because it contains non-logical terms. But it is a logical consequence—because it is an instance—of the logical law of non-contradiction: 'For any proposition *P,* it is not the case both that *P* and that not-*P*'. What we then have to consider is the status of the further proposition: 'The proposition that it is not the case both that Ferdy is a female fox and that Ferdy is not a female fox is an instance of the logical law that for any proposition *P,* it is not the case both that *P* and that not-*P*'. Call this proposition '*X*'. Ought we to say that *X,* like the two propositions to which it refers, is strictly logically necessary? Clearly, *X* is not itself a law of logic. So is it then a logical consequence of the laws of logic—and if so, what are the relevant laws? The answer seems to be that we would do well not to look for such laws, because even if we found some, a structurally similar problem would arise one level up.

But what makes *X* true, and necessarily so, if it is not strictly logically necessary? Well, what *X* expresses is a relationship between certain propositions, that is, between certain abstract entities which exist in every possible world. And that relationship obtains in every logically possible world, so that *X* is *broadly* logically necessary. Isn't that enough? Strictly logically necessary propositions are ones that are true in virtue of the laws

of logic alone—and sometimes this is a matter of the propositions in question being logical consequences of those laws: but true propositions stating the existence of logical consequence relations between other propositions are only *broadly* logically necessary—they express *metaphysical* necessities. The lesson would seem to be that logic, in the strict sense, is undergirded by metaphysics—as indeed is every other intellectual discipline. This serves to reinforce our earlier conclusion that logic by itself cannot be called upon to do the work of metaphysics.

7. Metaphysics, Actuality, and Experience

Having now explained why I hold that the realm of metaphysical possibility constitutes a distinct arena of rational inquiry, I want to return to the issue of what metaphysics can tell us about reality. I have suggested that metaphysics by itself can only tell us what is metaphysically possible, not which of various alternative metaphysical possibilities actually obtains. But this claim clearly needs some refinement. First, it would be unwise to rule out altogether the possibility of metaphysics by itself (or at most in conjunction with logic) establishing the existence of *some* metaphysically *necessary* states of affairs. Indeed, it would seem incoherent to attempt to rule this out, given that one can establish that some states of affairs are *not* metaphysically possible, by deriving a contradiction from the supposition that they are: for to establish, thus, that it is *not* metaphysically possible for *S* to exist is to establish that it is metaphysically necessary for *S not* to exist. However, what can be established by such purely logical means will not be a *substantive* metaphysical necessity, but rather just a logical impossibility (in the strict or narrow sense). A substantive metaphysical necessity, such as the necessary existence of God or of time, would be very much harder to establish. Second, the conclusions of metaphysical arguments will often have the form of *conditional* statements, which are themselves shown by such arguments to be unconditionally true. For instance, such a conclusion might be that *if* time is real, *then* some persisting substance must exist. The fact that metaphysics often delivers conclusions of this form in no way conflicts with the claim that the primary object of metaphysics is to establish the metaphysical possibility of various states of affairs and that it does not, in general, tell us by itself that such-and-such a state of affairs actually obtains. Indeed, establishing the possibility of a state of affairs is often done precisely by showing that it necessarily *would* obtain *if* some other state of affairs, which has already been shown to be possible, were to obtain.

How, then, are we to form rational judgements as to which of various

metaphysically possible alternatives do actually obtain? In a word: by experience. Knowing how the world *could* be in respect of its fundamental structure, we must judge as best we can how it *is* by determining how well our experience can be accommodated with this or that alternative metaphysical possibility as regards that structure.[22] This may appear to give metaphysical theorizing a status similar to that of scientific theorizing, but the similarity is only superficial. A judgement that the world actually exhibits a given metaphysical feature—for instance, that it contains substances or that time is real—will indeed be an a posteriori judgement, being responsive to the evidence of experience. But the content of the judgement still retains its modal character as expressing a genuine metaphysical possibility, albeit one judged now to be actualized. This view of the epistemological status of metaphysical claims, as being at once a posteriori and modal, is obviously akin to the view commonly associated with Kripke. He claims, for instance, that some truths of identity and constitution are metaphysically necessary and yet knowable only a posteriori.[23] What can be known a priori, according to Kripke, is only that *if* an identity between objects *a* and *b* obtains, *then* it obtains of metaphysical necessity—but *that* it obtains can only be known a posteriori. As it happens, I am not entirely convinced by this particular Kripkean claim—or, at least, by his argument for it—nor by his connected claim that the original constitution of an object is metaphysically necessary.[24] But I wholeheartedly endorse his insight that metaphysics can at once be concerned with *modal* truths and yet deliver answers to questions about actuality which are, and have to be, a posteriori in character.

Kant, of course, thought otherwise. He thought that to the extent that metaphysics can tell us anything about actuality, it must issue in a priori judgements. It must tell us, independently of any recourse to the evidence of experience, that the world must be thus-and-so. And its deliverances must not be mere analytic truths, which would reveal only logical connections between certain of our concepts, without any guarantee of those concepts answering to reality. It must then deliver a priori, substantive, and necessary truths—a tall order. No wonder that Kant concluded that

[22] Here it may be objected that circularity—or at least relativism—is threatened by my concomitant claim that experience itself is, as it were, metaphysically laden. But in fact this need no more create a problem than does the theory-laden nature of observation in the case of empirical scientific theory. At most, all that needs to be abandoned is any simple-minded foundationalism in either realm of inquiry, and an acceptance of some form of fallibilism.

[23] See Kripke, *Naming and Necessity,* 97 ff.

[24] See my 'On the Alleged Necessity of True Identity Statements', *Mind,* 91 (1982), 579–84.

the 'actual' world of which metaphysics speaks can only be the phenomenal world as humanly experienced, not reality 'as it is in itself'. But if we give up the vain hope that metaphysics can provide absolutely certain and unalterable insights into the fundamental nature of things, we can retain the conviction that metaphysics itself is a viable a priori discipline, and moreover one which deals in *real* possibilities—that is, possibilities for reality 'as it is in itself'.

Kant would object here that the 'categories' are only capable of legitimate employment when restricted to objects in space and time, which he regarded as phenomenal. But such a restriction is wholly unwarranted and the attempt to impose it leads Kant into self-contradiction. Whether space and time are 'phenomenal', and thus not features of reality independently of the way in which we experience it, is itself an important metaphysical question—so that, to the extent that Kant himself attempts to offer a reasoned answer to this question, he cannot consistently claim that metaphysics is or should be concerned only with how things are in the phenomenal world. When we examine his arguments for the phenomenal status of space and time, we find that he says, for instance, that if space were real, it would have to be a real 'non-entity', apparently because it could not be a substance nor a relation between substances.[25] But this is

[25] See Kant, *Critique of Pure Reason,* A 39–40, B 56–7. That such a 'non-entity' [*Unding*] *cannot exist in reality* is, of course, itself a metaphysical claim, whose truth requires to be established for the success of Kant's argument. The relevant passage of the *Critique* reads, in Kemp Smith's translation, as follows: 'Those . . . who maintain the absolute reality of space and time, whether as subsistent or only as inherent . . . [either] have to admit two eternal and infinite self-subsistent non-entities (space and time), which are there (yet without there being anything real) only in order to contain in themselves all that is real [*zwei ewige und unendliche für sich bestehende Undinge (Raum und Zeit) . . . welche dasind (ohne dass doch etwas Wirkliches ist), nur um alles Wirkliche in sich zu befassen*] . . . [or] are obliged to deny that *a priori* mathematical doctrines have any validity in respect of real things (for instance, in space).'Kant's targets are, of course, the views of Newton and Leibniz respectively. His objection here to the relational theory of space presupposes the correctness of his view that geometrical truths have an a priori synthetic status—a view which can no longer be taken seriously. But even if that view of geometry were correct, it cannot be valid to argue for the phenomenal status of space on such purely epistemological grounds; one must in addition at least establish that it is impossible for us to have substantive a priori knowledge of a mind-independent reality, and this is a *metaphysical* claim. Elsewhere, of course, Kant uses the argument from incongruent counterparts against the relational theory, though this is, once again, a straightforwardly metaphysical argument in my sense. (See, especially, Kant's pre-critical work, *Concerning the Ultimate Foundation of the Differentiation of Regions in Space,* in *Kant: Selected Pre-Critical Writings,* trans. G. B. Kerferd and D. E. Walford, Manchester: Manchester University Press, 1968.)I have, incidentally, included the original German at one point in my quotation above from the *Critique,* where Kemp Smith's translation is not entirely perspicuous. By *wirklich* I take Kant to mean here not just 'real' in the sense of being objectively existent, for that would make his relative clause [*welche dasind (ohne dass doch etwas Wirkliches ist)*] express something little short of a contradiction. (There can't be something 'there'—not even a 'non-entity'—without there being something existent.) Thus—here, at least—I take Kant to mean, by *wirklich,* 'real' in a more substantial sense, perhaps one which implies being *efficacious* (*wirksam,* in German). It is, of course, a familiar complaint against the Newtonian conception of absolute space that it is hard to see how the existence of space thus conceived could make any difference to the behaviour of physical things. (This, again, is a metaphysical point.) For a related discussion of Frege's use of the word *wirklich,* see Michael Dummett, *Frege: Philosophy of Mathematics* (London: Duckworth, 1991), 80–1.

just a *metaphysical* argument: not one which I find very compelling, indeed, but still one which conforms to the conception of metaphysics which I have been defending. And the telling point is that it does not respect the official Kantian restriction to speak only of objects in the phenomenal world of human experience. (How *could* it respect that restriction, given that it is an argument *for* the phenomenal status of that world?) It is indeed possible that space and time are 'unreal', in the sense that our best judgement as to how in actuality reality is fundamentally structured will not find an application for these notions. But if so, that judgement will have been arrived at in part through metaphysical argument in which the categories (not precisely Kant's categories, of course) have been deployed in a way unhampered by Kant's attempted restriction.

The question remains as to precisely how, on my view, experience may enable us to advance from a judgement of metaphysical possibility to a claim that such a possibility is actualized. But there is no general algorithm to be discovered here. Each case must be assessed individually, on its merits. This is one reason why the Dummettian vision of resolving the outstanding problems of metaphysics by the general strategy of examining the applicability of the bivalence principle seems somewhat facile. The sorts of empirical consideration which will bear on the question of whether *time* is real, and the way in which they will bear upon it, can be expected to have little similarity with the corresponding issues to do with the question of whether the *self* is real, for instance. However, a simple example will illustrate how, in a particular case, empirical considerations can interact with a priori metaphysical argument to motivate a claim about actuality.

Consider, as a case study, David Lewis's claim that persisting objects perdure rather than endure—that is, that they persist by virtue of having successive temporal parts at successive moments of time. He argues for this on the grounds, *inter alia,* that only thus can we explain the possibility of such objects undergoing *intrinsic change,* that is, undergoing a change of their intrinsic or non-relational properties, such as a change

from possessing a bent shape to possessing a straight shape.[26] Lewis holds that it is different temporal parts of the persisting object which must possess the different shapes, so that the persisting object only possesses them derivatively, by virtue of consisting of a succession of such parts some of which possess different shapes. To this it may be replied that if all objects capable of undergoing intrinsic change are ultimately composed of intrinsically unchanging objects—'atoms' of some sort—upon whose properties the properties of those changeable objects supervene, then we need not after all suppose that *any* persisting objects have temporal parts.[27] The atoms need not have, because, *ex hypothesi,* they do not undergo intrinsic change. Nor need the intrinsically changeable objects which are composed by the atoms, because on the proposed account an intrinsic change in the properties of a composite object is ultimately just a change in the relations between its atomic constituents. Now, whether one is convinced by this reply is not relevant here (though we shall be looking into the issue much more deeply in Chapter 5). What is of interest now is that it presents us with an opportunity to combine metaphysical argument with empirical scientific theory in order to reach a judgement as to whether or not a certain metaphysical view is plausibly true in actuality—in this case, the view that persisting objects have temporal parts. If the metaphysical argument just given is sound and it is *also* the case that empirical science gives us good reason to believe that atomism (in some appropriate form) is correct, then we shall have grounds—partly a posteriori ones—for claiming that persisting objects do *not* in fact have temporal parts.

Oddly enough, many philosophers feel distinctly uneasy about combining empirical and metaphysical considerations in this way: they make remarks about the dangers of 'giving hostages to fortune'—that is, opening oneself up to the possibility that one's claims about the metaphysical features of actuality will be undermined by developments in empirical scientific theory. This, I think, can only be because they still hanker after the impossible 'rationalist' dream of being able to determine the fundamental structure of reality wholly a priori and with absolute certainty. Kant taught us that this is indeed a dream. But, regrettably, rather than continuing to trade in reality, he opted for the comforts of certainty and empirical inviolability. The message that I have been trying to convey in

[26] See David Lewis, *On the Plurality of Worlds* (Oxford: Blackwell, 1986), 202 ff.

[27] See further my 'Lewis on Perdurance versus Endurance', *Analysis,* 47 (1987), 152–4, my 'The Problems of Intrinsic Change: Rejoinder to Lewis', *Analysis,* 48 (1988), 72–7, and Chapter 5 below.

this chapter—and hope to reinforce throughout the book—is that metaphysics can indeed be about reality, and can avoid collapse into empirical scientific theory, provided we can learn to be content with the fact that, as far as actuality is concerned, metaphysics cannot provide us with certainties.

2 Objects and Identity

In the previous chapter, I pointed out that metaphysics has its own distinctive vocabulary—a vocabulary which is quite as essential to it as the vocabulary of numbers and sets is to mathematics—and that one of the most important functions of metaphysical thinking is to explicate the proper use of this vocabulary and to chart the systematic semantic relationships which obtain between its ingredient terms. But this should not be seen merely as a linguistic exercise: we are interested in metaphysical terminology only because we are interested in the metaphysical concepts or notions which such terminology serves to convey. However, some of these concepts are clearly more fundamental or central to metaphysical thinking than others, so it is obviously sensible to begin the exercise by focusing on such concepts. In this chapter I shall concentrate on what seem to me to be the two most important of all metaphysical notions: the notion of an *object* and the notion of *identity*. Because they are so fundamental, neither term can, I think, be provided with an explicit, non-circular definition (any definitions one ventured to offer would, I believe, at least implicitly presuppose a grasp of the very notions in question). But this doesn't mean that nothing at all can illuminatingly be said about these notions: on the contrary, it should still be possible to provide rich *characterizations* of them, rendering perspicuous the relationships they bear to other metaphysical concepts and thereby displaying the centrality of their role in metaphysical thinking. As we shall see, the notion of an object is in fact intimately related to that of identity, though the proper explication of this relationship is a matter of controversy—part of the controversy turning on whether, and if so how, this relationship is mediated by the further concept of a *criterion* of identity.

Precisely because the notions of an object and of identity play such a pervasive role in metaphysical thinking, some of the issues which are discussed in more detail in later chapters of this book are given a preliminary airing in the present chapter —for example, issues to do with the nature of abstract entities (further explored in Chapter 10) and issues to do with time (further explored in Chapters 4 and 5)—so that to this extent the present chapter is intended to carry further forward the introductory task of Chapter 1.

1. Talking of 'Objects'

'Object' and 'criterion of identity' are philosophical terms of art whose application lies at a considerable theoretical remove from the surface phenomena of everyday linguistic usage. This partly explains their highly controversial status, for their point of application lies precisely where the concerns of linguists and philosophers of language merge with those of metaphysicians. The degree of controversy concerning these terms has indeed prompted some scepticism as to their utility,[28] but a less pessimistic response would be to try to exercise greater care and discrimination in their use.[29] Both terms are undeniably slippery, especially 'object'. Our concern will be with the sense of 'object' in which it is interchangeable with 'thing', but it is important to see that this only coincides with a restricted sense of 'thing'. For we seem to use the word 'thing' in both a narrow and a broad sense, the former associated with the free-standing use of the word and the latter with its use in combination with quantifying adjectives to form unitary quantifier expressions such as 'something' and 'everything'.[30] The difference is brought out by reflecting on the two non-equivalent sentences 'Every thing is a thing', which is trivially true, and 'Everything is a thing', which is metaphysically controversial. (The first sentence means 'Everything which is a thing is a thing', and is trivial in just the way that 'Every horse is a horse' is trivial; the second sentence, by contrast, is controversial rather in the way that 'Everything is a horse' would be.) As we shall see, some philosophical answers to the question 'What is a thing?' effectively ignore or deny this distinction. My own view is that the distinction is indeed a genuine one and that it is the narrower sense of 'thing' which defines an ontologically significant category. What is crucial to the status of 'thinghood' in this narrower sense is, I consider, the possession of determinate identity-conditions (see section 3 below). This is where the notion of a 'thing' or 'object' ties in with that of a *criterion of identity,* for one guarantee that something possesses determinate identity-conditions is that it falls under a general concept which supplies a definite criterion of identity for its instances. (Such a concept may be classified as a 'sortal'.)

As I have already implied, the term 'criterion of identity' is, unfortunately, itself the subject of considerable dispute. One problem is that candidates for this title typically take one or other of two quite different

[28] See e.g. P. F. Strawson, 'Entity and Identity', in H. D. Lewis, ed., *Contemporary British Philosophy, Fourth Series* (London: George Allen & Unwin, 1976).

[29] Cf. my 'What Is a Criterion of Identity?', *Philosophical Quarterly,* 39 (1989), 1–21.

[30] Cf. Roger Teichmann, *Abstract Entities* (Basingstoke: Macmillan, 1992), 15–16, 166–7.

logical forms, whose difference turns on the mode of reference they involve to the objects for whose identity they provide a criterion (see section 5 below). Some objects are such that a canonical mode of reference to them by means of *functional* expressions of a quite specific kind is available. For instance—to use a famous example of Frege's[31]—a particular *direction* may be canonically referred to as the direction *of* a particular line. (Any expression like this, of the form 'the *F* of *a*', may be called a functional expression.) In this particular case the object in question is, of course, not a *physical* object, but rather a geometrical one: and this fact may encourage the thought that it is a peculiarity of those objects for which a functional mode of reference is canonical that they are in some sense *abstract,* with logico-mathematical objects such as directions, shapes, numbers, and sets providing paradigm examples.[32] However, as we shall see, the distinction between 'abstract' and 'concrete' objects is itself a highly controversial one. And although, indeed, it has been argued that this distinction turns ultimately upon differences between the criteria of identity governing objects of these two broad categories (see section 10 below), it certainly does not appear to be simply related to the distinction between those criteria which do and those which do not involve functional modes of reference to the objects they concern. (For one thing, we have indisputably 'abstract' objects such as sets, for which a criterion of identity is available which does *not* involve a functional mode of reference to them.) For my own part, I do not think that the distinction between the two different types of identity criterion is one which ultimately serves to *explain* any basic metaphysical, semantic, or epistemological distinction between the categories of objects to which they apply (although, as I shall acknowledge in Chapter 10, it may perhaps *reflect* a certain kind of ontological distinction which requires to be *explained* in another way). This being so, however, one might expect to be able to supplant one or other type of criterion by the other—and I shall indeed try to show how such an expectation may be satisfied in specific cases (see sections 7 and 8 below).

Of course, the very *existence* of abstract objects is itself a matter of considerable philosophical controversy, though I shall postpone discussion of this to Chapter 10.[33] However, one should at least be clear as to what is *meant* by the expression 'abstract object' before one debates whether or not anything answers to that description. The putative examples

[31] See Gottlob Frege, *The Foundations of Arithmetic,* trans. J. L. Austin (Oxford: Blackwell, 1953), 74 f.

[32] Cf. Michael Dummett, *Frege: Philosophy of Language,* 481.

[33] But see further Hale, *Abstract Objects,* and Teichmann, *Abstract Entities,* for very contrasting views.

which I have so far mentioned—all of them logico-mathematical—are at least provided with clear-cut and unimpeachable criteria of identity, but other putative examples such as propositions, facts, and properties do not appear to be so favoured. This puts pressure on the idea that propositions and the like possess determinate identity-conditions at all, and consequently on the idea that they qualify as 'objects' or 'things' (in my narrow sense). That may seem no great loss, until we come to reflect that we can, ostensibly at least, *quantify over* and *refer to* propositions, facts, and properties. In reply it may be urged that we can plausibly represent such 'quantification' and 'reference' as convenient *façons de parler,* capable of being paraphrased away innocuously. However, the strategy of paraphrastic elimination is one which must be handled with a good deal of caution (as we shall see in section 3 below). But before we can tackle such issues, we need to examine the role which criteria of identity play in our talk about objects of the least controversial varieties.

2. Sortals and Counting

It is a familiar but none the less important philosophical point that an instruction simply to count how many *things* there are in a given room at a certain time is one that cannot be carried out: not because there will always be too many things to count, but because the instruction does not even make determinate sense in the absence of a specification of the *sorts* or *kinds* of things that are to be counted.[34] It makes sense to ask how many *books* there are on a shelf, or how many *girls and boys* there are in a class, because in these cases an appropriate specification is supplied. But what exactly is the nature of such a specification and what role does it play in conferring determinate sense upon such a question? In brief, the point is this. If one is to *count* or *enumerate* items, then it seems that one must at least be able to *identify* and *differentiate* them, because otherwise some things might be counted more than once. (Just what 'counting' *is* is something that we shall return to later, in section 9; I should also remark that the connection between counting and identification, although obvious enough in the case of ordinary macroscopic objects, can break down in more esoteric cases, as we shall see in Chapter 3.) For instance, if I count the books on a certain shelf, I must count each book just once, so that I must be clear as to what differentiates one book from another. A crucial

[34] Cf. P. T. Geach, *Reference and Generality,* 3rd edn. (Ithaca, N.Y.: Cornell University Press, 1980), 63 f., Dummett, *Frege:Philosophy of Language,* 547 ff., Wright, *Frege's Conception of Numbers as Objects,* 3, and my *Kinds of Being: A Study of Individuation, Identity and the Logic of Sortal Terms* (Oxford: Blackwell, 1989), 10 ff.

point here is that what differentiates one *F* from another may not be the same as what differentiates one *G* from another (where '*F*' and '*G*' are sortal terms—or, as the linguists appropriately call them, *count nouns*—such as 'book' and 'child'). And this is because different sortal concepts may supply different *criteria of identity* for the individuals falling under them. A graphic example is provided by an ambiguity in the term 'book' itself, whereby it may either denote a kind of physical object made out of paper, glue, and thread or else a kind of abstract entity possessing certain semantic and syntactic properties. We might call an item of the former kind a 'copy' and an item of the latter kind a 'work'. On a given shelf there might be several copies 'of' the same work, and so the number of books on the shelf in the former sense of 'book' would be greater than the number of them there in the latter sense.

A further point which emerges from this example, and to which we must return, is that some sortals denote kinds of *concrete* object while others denote kinds of *abstract* object—a distinction of importance but one whose definition is controversial (see section 10 below and Chapter 10). Observe, incidentally, that I spoke above as though items of the abstract kind denoted by the term 'work' might literally occupy a position in space—for instance, a place on a bookshelf—but we shall see later that such talk should perhaps be interpreted in a more roundabout way. (What about *kinds* themselves—are they objects, and if so are they abstract objects? Again this is something to which we shall return.)

Yet another point emerging from the problem of counting is this: although one must specify what sorts of things are to be counted in order to render determinate an instruction to count, it would be wrong to suppose that one can only meaningfully count things of the same kind.[35] As an earlier example implied, one may count the *boys and girls* in a class, and these are not the same kinds. It is true that boys and girls are both *children,* but that is by the by: one could meaningfully count the *boys and books* in a room, even though there is no single kind (governed by a single criterion of identity) of which both boys and books are sub-kinds. What is crucial is that if one is to count the *F*s and *G*s, then (i) *F* and *G* must each supply determinate identity-conditions for their instances and (ii) *F* and *G* must be *disjoint* kinds, so that nothing can be an instance of both: for example, one cannot sensibly be asked to count the *dogs and animals* in a room—although, I suppose, a request to do so might charitably be interpreted simply as a request to count the *animals* there. (Again I should

[35] Cf. Jonathan Bennett and William Alston, 'Identity and Cardinality: Geach and Frege', *Philosophical Review,* 93 (1984), 553–67, and my *Kinds of Being,* 105.

remark that condition (i) is subject to certain complications which we shall explore in Chapter 3, but it would be out of place to dwell on them here.)

Finally, I should remark that the fact that a general term conveys a criterion of identity for items to which it applies is not a sufficient condition for it to be possible, even in principle, to *count* such items. For *mass* terms such as 'gold' and 'water' appear to convey criteria of identity, but not necessarily countability—one can meaningfully ask whether the gold in this room (which might be scattered about it in the form of dust) is *the same* as the gold which formerly composed a certain ornament, even though it makes no sense to ask *how many* portions of gold are currently present in this room, not least because any portion of gold contains other portions of gold as proper parts.[36] (By contrast, it does make sense to ask *how much* gold there is in this room.) This shows that a criterion of identity is not exactly the same as a *principle of individuation,* though in the remainder of this chapter we shall chiefly be concerned with count nouns, for which this distinction does not really emerge.[37] (A principle of individuation, we might say, is not so much a criterion of *identity* as a principle of *unity*: countable items are singled out from others of their kind in a distinctive way that is determined by the sortal concept under which they fall, whereas portions of stuff can only be singled out in *ad hoc* ways, of which there are indefinitely many—as when a portion of gold is singled out as the gold composing a certain ring. These, however, are matters which we shall discuss much more fully in Chapter 3.)

3. What Is an Object?

Of course, not all general terms are sortals, typically supplying a criterion of identity for the items to which they apply: there are also 'adjectival' general terms (Geach) or 'characterizing' universals (Strawson), which supply no such criterion and are, indeed, applicable to things of many different kinds—for example, 'wise' and 'red thing'.[38] 'Thing' itself is the most general such term and is often used interchangeably with the term 'object', both sometimes being dubbed '*dummy* sortals'.[39] But what *is* an object, in the most general sense of that term? One popular answer, which

[36] See further Peter Simons, *Parts: A Study in Ontology* (Oxford: Clarendon Press, 1987), 153ff.

[37] But see further M. J. Woods, 'Identity and Individuation', in R. J. Butler, ed., *Analytical Philosophy,* Second Series (Oxford: Blackwell, 1965).

[38] See Geach, *Reference and Generality,* 63 f., and Strawson, *Individuals,* 168.

[39] Cf. David Wiggins, *Sameness and Substance,* 63 f.

I shall call the 'Semantic Answer', is that anything that can be referred to at all—anything that can be made the *reference of a singular term* or be the *value of a variable of quantification*—is a 'thing' or 'object'.[40] Another possible answer, which I shall call the 'Metaphysical Answer', is that the term 'object' properly applies to any item which enjoys determinate identity-conditions and hence to any item falling under some sortal concept supplying a criterion of identity for its instances—so that by this account a particular *book* (whether a 'copy' or a 'work') and a particular *boy* would qualify as paradigm examples of 'objects'.

In the remainder of this section, I shall examine these two rival answers to the question 'What is an object?'—the Semantic Answer and the Metaphysical Answer—coming down eventually in favour of the latter. According to the Semantic Answer, recall, an object is to be conceived as a possible referent of a singular term (Frege's view, as interpreted and defended by Michael Dummett) or as a possible value of a variable of quantification (Quine's view, encapsulated in his slogan 'To be is to be the value of a variable').[41] The former version requires us to be able to define 'singular terms' independently of the notion of an object, most plausibly by appeal to their logical characteristics—that is, by appeal to the patterns of deductive inference characteristically sustained by sentences in virtue of their containment of singular terms. It must be emphasized, however, that at this stage what is at issue is not so much the question of what objects *there are* as the question of what it is *to be* an 'object'. According to the Semantic Answer, in its first version, we can only grasp the notion of an object via the notion of a singular term: singular terms are (potentially) *object-denoting,* but this fact should be construed as explaining the notion of an object rather than as explaining the function of a singular term.

Now, of course, there can be *empty* singular terms, which fail to denote any existing object. However, if a sentence containing a singular term is *true,* then, on the present account, that term does indeed denote an object. (Failure of a singular term to denote an object leads to a lack of truth-value for the sentence containing that term.) But this threatens to produce a grossly overinflated ontology, with a world populated by many more

[40] Cf. Frege, 'On Concept and Object', in *Translations from the Philosophical Writings of Gottlob Frege,* 2nd edn., ed. and trans. P. T. Geach and M. Black (Oxford: Blackwell, 1952), and *The Foundations of Arithmetic,* Wright, *Frege's Conception of Numbers as Objects,* and W. V. Quine, 'On What There Is' and 'Logic and the Reification of Universals', both in his *From a Logical Point of View.*

[41] See e.g. Dummett, *Frege: Philosophy of Language,* ch. 4, and W. V. Quine, 'Speaking of Objects', in his*Ontological Relativity and Other Essays* (New York: Columbia University Press, 1969).

species of objects than common sense would suggest. Take, for instance, a sentence such as 'The grin on John's face is broad', which could certainly be true. If it *is* true, however, advocates of the present account must apparently say that the singular term 'the grin on John's face' denotes an *object,* which actually exists and is somehow related to two further (and less contentious objects), John and John's face. That seems extravagant, to say the least. The same applies, *mutatis mutandis,* for the second version of the Semantic Answer, as regards the sentence 'John is wearing a broad grin', which ostensibly involves quantification over *grins.* (That sentence would standardly be regimented in the form 'For some x, x is a grin and x is broad and John is wearing x'.)

In the face of these remarks, advocates of the Semantic Answer might appeal to the fact that the two sentences in question—'The grin on John's face is broad' and 'John is wearing a broad grin'—can plausibly be *paraphrased* by the sentence 'John is grinning broadly', in which no singular term or quantifier appears: the suggestion being that this shows that the truth of the former two sentences by no means implies the existence of such objects as 'grins'. Using the same strategy, these philosophers may likewise hope to eliminate reference to or quantification over—and hence, by their own lights, avoid ontological commitment to—such items as *facts, propositions,* and *properties.* For example, they may point out that a sentence such as 'The fact that John was promoted pleased me greatly' may plausibly be paraphrased quite simply, and less sententiously, as 'I was greatly pleased that John was promoted'. However, it is important to observe that paraphrase is a *symmetrical relation* (if sentence *S*1 is a paraphrase of sentence *S*2, then, equally, *S*2 is a paraphrase of *S*1): and it seems that nothing purely within the theory of meaning is capable of telling us *which* of two sentences which are paraphrases of one another more accurately reflects the ontological commitments of those who utter them.[42] The mere fact that a singular term can be 'eliminated' by paraphrase cannot, by the semanticist's own lights, be taken to show that it is not 'really' object-denoting: for the semanticist has no *independent* account of objecthood to appeal to—and the same applies, *mutatis mutandis,* to the quantificational approach. Another pertinent point is that it may turn out to be possible to eliminate by paraphrase even reference to and quantification over such paradigm examples of objects as books and children,[43] but we obviously would not want to say in these cases that such a possibility

[42] See Wright, *Frege's Conception of Numbers as Objects,* 25 ff.; but see also Teichmann, *Abstract Entities,* for a defence of the claim that a privileged direction of paraphrase may be discerned.

[43] See e.g. W. V. Quine, 'Variables Explained Away', in his *Selected Logic Papers* (New York: Random House, 1966).

threatened the status of such items as 'objects', much less their very existence.

To the first of the foregoing objections the first sort of semanticist might perhaps be tempted urge that *definite descriptions,* such as 'the grin on John's face', are not 'really' singular terms after all—taking, perhaps, a Russellian view of these as covertly quantificational. (Frege himself, of course, would not have taken such a view.) But this is not a plausible strategy, in the light of the fact that many definite descriptions (though certainly not this one) plausibly *are* 'object-denoting'—for instance, 'the present Prime Minister of the United Kingdom'. In any case, the strategy seems likely only to lead to a replacement of the first version of the Semantic Answer by the second (that is, the quantificational version), which is really in no better shape.

Another way in which advocates of the Semantic Answer, in either version, might hope to defend it is by insisting that all 'genuine' singular terms or quantifier expressions need to be backed by the provision of *criteria of identity* for the objects denoted or quantified over (recall Quine's other famous slogan, 'No entity without identity', and the Frege–Dummett thesis that singular terms can only be introduced in association with criteria of identity for their references). Then it might be urged that 'grins' and the like can be provided with no such criterion, thus deflating what would otherwise be a grossly overblown ontology. However, in the first place, even if it is agreed that there is no principled or well-motivated criterion of identity for 'grins' (say), it is not at all obvious *why* this fact should be supposed to undermine the credentials of sentences such as 'The grin on John's face is broad' and 'John is wearing a broad grin' to be taken at their face-value as making reference to or quantifying over grins. Nor, hence, is it obvious how appeal to the supposed lack of such a criterion can enable the semanticist to avoid commitment to the existence of such objects as grins according to his own principles. Secondly, whatever its merits, the move in question—that of insisting that all 'genuine' singular terms or quantifier expressions need to be backed by the provision of criteria of identity for the objects denoted or quantified over—already appears to be a concession in the direction of admitting that metaphysical considerations independent of the theory of meaning are relevant to the questions of what an object is and what objects there are: for identity criteria are precisely *metaphysical* principles, telling us (as Locke would put it) what identity *consists in* for objects of given kinds. (It is true that they are *also* semantic principles, to the extent that the meaning of a kind term, such as 'dog', cannot be adequately grasped without a grasp of the identity criterion governing objects of that kind: but that in no way undermines the point that has just been made.) Finally, it is in any

case strongly arguable, on metaphysical grounds, that not *all* kinds of objects can be provided with criteria of identity, because in the case of objects of some kinds their identity *cannot* be taken to 'consist in' anything else. For these 'basic' objects—and, arguably, any ontology must include some—identity is primitive and irreducible.[44] This may, for instance, be true of *persons*.[45] So, all in all, it seems that the Semantic Answer really has rather little to be said in its favour.

I turn, then, to what I call the Metaphysical Answer to the question 'What is an object?'. As I have already indicated, the answer I have in mind here is simply that to be an *object* is to be an entity possessing *determinate identity-conditions* (though not necessarily a *criterion* of identity, for the reason just given). By this account, if *x* and *y* are *objects,* there must be a 'fact of the matter' as to whether or not *x* is identical with *y*. That is to say, the identity statement '*x* = *y*' must be of determinate truth-value. (To put it this way is not, however, to make any concession towards the Semantic Answer, because I do not believe that one can assess whether an identity statement is of determinate truth-value without recourse to independent metaphysical argument; thus, not too much should be read into any superficial similarity between the Metaphysical Answer as just stated and Dummett's semanticist characterization of 'realism' as a matter of a commitment to the principle of *bivalence*.)[46] As an illustration of how the Metaphysical Answer may be applied, one reason why I am inclined to doubt whether so-called subatomic 'particles' are properly to be thought of as *objects* is that it seems that in their case identity statements concerning them can genuinely be indeterminate.[47] (Note here, with regard to the issue of 'wave-particle' duality, that waves—even those of the ordinary seaside variety—are indeed not 'objects' according to the Metaphysical Answer, because they too lack determinate identity.)

Now, it is a clear implication of the Metaphysical Answer that there can exist 'entities' which are *not* objects. (Waves provide an example—as, indeed, do grins. So let it not be thought that my criticism of the Semantic Answer for being ontologically extravagant turned on its committing us merely to the *existence* of grins and the like: rather, the charge against it is that it commits us to regarding such items as *objects,* on a par with such uncontentious objects as books and people—a charge which its adherents

[44] See further my *Kinds of Being,* ch. 2, my 'Primitive Substances', *Philosophy and Phenomenological Research,* 54 (1994), 531–52, and Chapter 7 below.

[45] I argue that it is indeed true of persons, in my *Kinds of Being,* ch. 7, and in my *Subjects of Experience* (Cambridge: Cambridge University Press, 1996), ch. 2.

[46] See e.g. Dummett, *The Logical Basis of Metaphysics* (London: Duckworth, 1991), Introduction.

[47] See my 'Vague Identity and Quantum Indeterminacy', 110–14, and Chapter 3 below.

can attempt to avoid only by *ad hoc* measures designed to deny the existence of such items altogether.) As we might put it (recalling the discussion of section 1 above), *not everything is a thing*—understanding 'thing' here to mean 'object'. Of course, according to the Quinean version of the Semantic Answer, this statement must necessarily be false: on that view, it is just *trivially true* that everything is a thing, since what the quantifier 'everything' ranges over is precisely *things*—which it does because 'things' themselves, by this account, are precisely to be understood as what the quantifier ranges over. But the first version of the Semantic Answer seems to imply a different response—witness Frege's distinction between objects and *concepts,* the latter precisely *not* being things or objects (I shall return to this distinction in the next section). Be that as it may, I myself am certainly happy to countenance the existence of many entities which are not objects or things—much as Strawson distinguishes between 'particulars' and 'non-particulars'.[48] Some of these entities can helpfully be described as 'ways things are', recalling to mind the Scholastic distinction between *substance* and *mode*. For example, an object's particular *shape* and *colour* can be thought of as 'ways it is'—namely, as *how* it is coloured and *how* it is shaped, respectively. But its colour, say, is not 'itself' an *object,* somehow related to the object of which it is the colour. If it *were* an object, it would have determinate identity-conditions—and yet it does not appear that it *can* have these. Supposing the coloured object to be uniformly coloured, it makes doubtful sense to ask whether the colour' of its top half is *numerically identical* with 'the colour' of its bottom half, or whether either or both of these are identical with 'the colour' of the whole object. Certainly, these questions cannot apparently be answered in a non-arbitrary and principled way. (Of course, the questions *do* make sense and trivially receive the answer 'Yes' if 'the colour of *a*' is construed as referring to a *universal*: but here I am supposing it to refer to what used to be called an 'individual accident' and would nowadays commonly be called a 'trope'. The matter is one which will receive a fuller airing in Chapter 3 and elsewhere in the book.)

It will be recalled that, in objecting to the Semantic Answer, I remarked that by that account a singular term in a true sentence or statement must be object-denoting. According to the Metaphysical Answer, no such conclusion can be drawn. On this view, for instance, we can allow the sentence 'The table at which I am writing is square' to be *true,* and allow, too, that the definite description here is as good an example of a 'singular term' as any, and yet leave it open whether tables (including 'this' one) *really exist*.

[48] See Strawson, *Individuals,* 226 ff.

And the reason for leaving this open need not have to do with any doubts that one might harbour as to whether tables have determinate identity-conditions. On metaphysical grounds, it might be plausible to hold, as Peter van Inwagen does, that although table-shaped collections of particles exist, tables do not.[49] As I shall explain more fully in later chapters, my view is that whether objects of a given kind should be thought *actually to exist* should, in general, be taken to turn on considerations of whether an inclusion of such objects in one's ontology has explanatory value. On this score, tables apparently do not fare all that well, since whatever facts they serve to explain can, it seems, be as easily explained by reference to table-shaped collections of particles, which must, at least in this world, be acknowledged to exist in any case. (In a world in which tables were *not* composed of such particles, matters might be otherwise.)

4.Frege on Concepts and Objects

It would not do to leave the Semantic Answer without some further discussion of the views of one of its most esteemed proponents, Gottlob Frege. For Frege, a crucial contrast is to be drawn between *objects* and *concepts,* the hallmark of the latter being their 'unsaturatedness'.[50] (The term 'concept' has today a psychological ring which would be quite alien to Frege's intention; in more familiar terminology it may be said to cover both *properties* and *relations.*) In Frege's view, then, the object/concept distinction is a reflection of the linguistic distinction between *subject* and *predicate.* What he has in mind, however, is not the ordinary grammatical distinction, but rather the logical distinction—the point being that not all grammatical subjects are object-denoting (for example, quantifier phrases, such as 'some boy' and 'every book', are not). So what sort of subject-term *is* object-denoting, on this view? In a word, *names* (*Eigennamen,* in Frege's terminology). However, these must be very broadly construed to include not just ordinary proper names but also definite descriptions (in their 'referential' uses),[51] demonstratives, personal pronouns, and so forth. All 'singular terms', then? Yes, but arguably more besides (even if Frege himself did not think so). For plural terms, such as 'the books on my shelf' and 'the Joneses' can function as logical subjects

[49] See Peter van Inwagen, *Material Beings* (Ithaca, N.Y.: Cornell University Press, 1990), ch. 13.

[50] See Frege, 'On Concept and Object', in *Philosophical Writings of Gottlob Frege.*

[51] See Keith Donnellan, 'Reference and Definite Descriptions', *Philosophical Review,* 75 (1966), 281–304.

and surely qualify as object-denoting.[52] Moreover, we should not assume that all object-denoting terms denote *individual* objects, for there are *mass* terms and *kind* terms (such as 'gold' and 'tiger' respectively) which apparently qualify as object-denoting despite not denoting individuals (particulars)—rather, they denote sorts or kinds (of stuff or things).[53]

Now sorts or kinds are universals, and therefore presumably *abstract* objects (of which more anon). But what about the adjectival or characterizing universals mentioned earlier—are they not likewise objects, at least according to the Fregean view now under examination? This is where we run into Frege's paradox of the concept *horse*.[54] However, bearing in mind what I have just said, 'horse' is an ill-chosen example because it is very arguable that 'horse' *does* function as a name and denotes an abstract object, the horse kind—for it can function as a logical subject, as in 'Horses eat grass' and 'Horses are mammals', which I for one do not see (in the way Frege did) as involving quantification over individuals.[55] A better example, from my point of view, would be the concept (or, as we might more familiarly say, the property) *being wise*. The point then is that '——is wise' functions as a *predicative* expression and so is not object-denoting by Frege's account, because what it expresses is 'unsaturated' (that is, the expression demands 'completion' by a name for an object in order to form a whole sentence expressing a unified proposition or 'thought', evaluable as true or false). But if we try to refer to what it expresses (by speaking of 'the concept *being wise*', or 'the property of wisdom', or even just 'what "——is wise" expresses'), then by Frege's own lights we only succeed, it seems, in referring to an *object,* which perforce is *not* the concept in question, but only a surrogate.[56] Quite what to make of this puzzle is far from clear, though Frege's own attitude to it—namely, that language prevents us from saying what we want to here, but that we can still somehow get the appropriate message across[57]—certainly does not appear at all satisfactory. I confess that I am strongly tempted to see the paradox as an artefact of the Semantic Answer to the question 'What

[52] See Richard Sharvy, 'A More General Theory of Definite Descriptions', *Philosophical Review,* 89 (1980), 607–24, George Boolos, 'To Be is To Be a Value of a Variable (or To Be Some Values of Some Variables)', *Journal of Philosophy,* 81 (1984), 430–49, and my 'Noun Phrases, Quantifiers, and Generic Names', *Philosophical Quarterly,* 41 (1991), 287–300.

[53] See my *Kinds of Being,* 138 ff., 199 ff., and 'Noun Phrases, Quantifiers, and Generic Names'.

[54] Frege, 'On Concept and Object', in *Philosophical Writings of Gottlob Frege.*

[55] See my *Kinds of Being,* 138 ff., and 'Noun Phrases, Quantifiers, and Generic Names'.

[56] See Dummett, *Frege: Philosophy of Language,* 211 ff., and Anthony Palmer, *Concept and Object* (London: Routledge, 1988), 36 ff.

[57] Frege, 'On Concept and Object', in *Philosophical Writings of Gottlob Frege.*

is an object?', and hence to regard it as a further consideration (though perhaps only a minor one) in favour of the Metaphysical Answer. (According to the Metaphysical Answer, of course, what—if anything—excludes properties such as wisdom from the realm of objects is that they lack determinate identity-conditions.)

Rather than pursue this dispute further, however, it may be more profitable to build upon the common ground which clearly exists between an advocate of the Metaphysical Answer, such as myself, and most proponents of the Semantic Answer (namely, those who also subscribe, with Frege and Quine, to the view that reference to and quantification over any class of items presupposes the availability of criteria of identity for those items). This common ground is that for many purposes we can take an object to be any item falling under a sortal concept which supplies a well-defined criterion of identity for its instances. (This characterization will not *ultimately* do, in my view, because I hold that there are, and must be, objects for which no non-circular criterion of identity can be supplied: see Chapter 7. However, for the present we may ignore this complication.) Our next task, then, is to attend to certain difficulties attaching to the very idea of a criterion of identity.

5. Two Forms of Identity Criterion

The notion of a criterion of identity is one which, again, we owe largely to Frege,[58] though we can find antecedents to it in ancient and medieval discussions of the *principium individuationis*.[59] Foremost, perhaps, amongst the difficulties attaching to this notion is the question of what *form* such a criterion may or should take. There are two paradigms to be found in the literature, which we may distinguish—using the convenient nomenclature of Timothy Williamson[60]—as 'one-level' and 'two-level' identity criteria.[61] Take the example of *sets*. A *one*-level criterion of identity for sets is provided by the Axiom of Extensionality, as follows:

(S1) $(\forall x)(\forall y)((\mathrm{Set}(x) \,\&\, \mathrm{Set}(y)) \rightarrow (x = y \leftrightarrow (\forall z)(z \in x \leftrightarrow z \in y)))$.

In words: if x and y are sets, then x is identical with y if and only if x and

[58] Frege, The *Foundations of Arithmetic,* 73 ff.

[59] See e.g. G. E. M. Anscombe, 'The Principle of Individuation', in her *From Parmenides to Wittgenstein: Collected Philosophical Papers,* vol. i (Oxford: Blackwell, 1981), and J. J. E. Gracia, *Introduction to the Problem of Individuation in the Early Middle Ages,* 2nd edn. (Munich: Philosophia, 1988); see also John Locke, *An Essay Concerning Human Understanding,* ed. P. H. Nidditch (Oxford: Clarendon Press, 1975), 328 ff.

[60] Timothy Williamson, *Identity and Discrimination* (Oxford: Blackwell, 1990), 145 ff.

[61] See also my 'What Is a Criterion of Identity?'.

y have the same members. A *two*-level criterion of identity for sets is provided by Frege's (fatal) Axiom V of the *Grundgesetze*:[62]

(S2) $(\forall F)(\forall G)(\{x\colon Fx\} = \{x\colon Gx\} \leftrightarrow (\forall x)(Fx \leftrightarrow Gx))$

In words: the set of *F*s is identical with the set of *G*s if and only if all and only *F*s are *G*s. This axiom was the source of notorious difficulty for Frege, because unless a suitable restriction on possible values of '*F*' and '*G*' is specified, Russell's paradox can be generated from it.[63] Other well-known Fregean two-level criteria of identity are his criterion of identity for *directions,*[64]

(D2) $(\forall x)(\forall y)((\text{Line}(x) \,\&\, \text{Line}(y)) \rightarrow (\text{d}x = \text{d}y \leftrightarrow x \,//\, y))$

(the direction of line *x* is identical with the direction of line *y* if and only if lines *x* and *y* are parallel with one another), and his criterion of identity for cardinal numbers,[65]

(N2) $(\forall F)(\forall G)(\text{N}x\colon Fx = \text{N}x\colon Gx \leftrightarrow (\exists R)(\{x\colon Fx\}\ 1\text{–}1R\ \{x\colon Gx\}))$

(the number of *F*s is identical with the number of *G*s if and only if the set of *F*s is one-to-one correlated with the set of *G*s).

The key formal differences between one-level and two-level identity criteria may be described as follows. One-level criteria explicitly quantify over objects of the sort for which they supply a criterion of identity, and state that criterion in terms of a biconditional, one side of which contains a simple expression of identity between such objects, and the other side of which expresses an equivalence relation obtaining between those identified objects. By contrast, two-level criteria quantify over items of a *different* kind from that of the objects for which they supply a criterion of identity, and state that criterion in terms of a biconditional, one side of which contains an expression of identity between such objects in which they are referred to by means of *functional* terms relating them to items of the kind quantified over, and the other side of which expresses an equivalence relation obtaining between the items to which the identified objects are thus related.

A difficulty which can beset either form of identity criterion is that of *impredicativity,* which threatens to render such criteria viciously circular. (An impredicative criterion is one which involves 'appeal to a totality that

[62] See 'Frege on Russell's Paradox' (*Grundgesetze der Arithmetik,* vol. ii, Appendix), in *Philosophical Writings of Gottlob Frege,* 234 ff. and Wright, *Frege's Conception of Numbers as Objects,* 155.

[63] See Wright, *Frege's Conception of Numbers as Objects.*

[64] Frege, *The Foundations of Arithmetic,* 74 f.

[65] Ibid. 73 f.

includes or depends on' the very objects whose identity is in question.)[66] It is important to recognize, however, that impredicativity does not *inevitably* give rise to vicious circularity. It doesn't, for instance, in the case of (S1), even if it is advanced in the context of 'pure' set theory of the Zermelo-Fraenkel type, in which all sets save the empty set only have other sets as members.[67] But there certainly *can* be such circularity, as for instance in Donald Davidson's one-level criterion of identity for *events*:[68]

(E1) $(\forall x)(\forall y)((\text{Event}(x) \,\&\, \text{Event}(y)) \rightarrow (x = y \leftrightarrow (\forall\, z)(\text{Event}(z) \rightarrow ((\text{Cause}(x, z) \leftrightarrow \text{Cause}(y, z)) \,\&\, (\text{Cause}(z, x) \leftrightarrow \text{Cause}(z, y))))))$

In words: if x and y are events, then x is identical with y if and only if x and y cause and are caused by the same events. This is circular in as much as what makes for sameness amongst events is precisely what a criterion of identity for events is supposed to convey, and yet a grasp of that is needed in order to understand what is expressed on the right-hand side of the main biconditional in (E1). (This is more obvious when (E1) is expressed in words as above than it is when logical symbolism is employed as in the formula (E1) itself: but there too we can see that the repetition of the variable 'z', understood as taking events as its values, is equivalent to an expression of event-identity.) A similar problem does not beset the criterion of set-identity (S1), despite the fact that sets may themselves be set-members, because—according to standard set theory, at least—sets belong to a cumulative hierarchy in which (S1) fixes the identity of each set recursively, beginning with sets which contain only non-sets as members (or with just the empty set in the case of 'pure' set theory).[69]

Certain difficulties peculiar to two-level criteria arise from the fact that they utilize *functional* expressions to refer to the objects for which they supply a criterion. One difficulty is that this limits their scope of application quite considerably, at least in the absence of further theorizing. For instance, we need to be able to employ other means of referring to numbers than expressions of the form 'the number of *F*s'—not least the numerals '1', '2', '3', etc. Thus Frege's criterion (N2) doesn't of itself help to determine the truth-conditions of a statement such as '1 + 2 = 3' or 'The

[66] W. V. Quine, 'Events and Reification', in E. LePore and B. McLaughlin, eds., *Actions and Events: Perspectives on the Philosophy of Donald Davidson* (Oxford: Blackwell, 1985), 166.

[67] See further my 'Impredicative Identity Criteria and Davidson's Criterion of Event Identity', *Analysis,* 49 (1989), 178–81.

[68] See Donald Davidson, 'The Individuation of Events', in his *Essays on Actions and Events* (Oxford: Clarendon Press, 1980), Quine, 'Events and Reification', and my 'What Is a Criterion of Identity?' and 'Impredicative Identity Criteria and Davidson's Criterion of Event Identity'.

[69] See further my 'Impredicative Identity Criteria'.

number of books on my shelf is eighteen'. Another difficulty is that when we turn away from the sort of mathematical examples which interested Frege, we are often hard put to think of an appropriate two-level way of stating identity criteria. Consider, for instance, the problem of *personal* identity: the trouble is that there is no standard *functional* mode of reference to persons as there is to directions and numbers and sets. Directions are directions *of lines,* and numbers are numbers *of objects satisfying some condition,* as also are sets. But persons aren't at all obviously persons 'of' anything at all in this sense; in short, it isn't obvious what domain of entities ought to be invoked in order that an equivalence relation on *them* may be cited as a criterion of identity for persons.[70]

Even setting aside the foregoing difficulties, which may not seem very serious, it is clear that the two-level approach to identity criteria contains a built-in limitation in as much as any such criterion presupposes the identity of items of one kind in providing a criterion of identity for those of another. Thus (D2) presupposes the identity of lines in providing a criterion of identity for directions and (N2) presupposes the identity of sets in providing a criterion of identity for cardinal numbers. (By saying that (D2) 'presupposes the identity of' lines I mean that in the absence of a further criterion of identity for *lines*—assuming that lines are not 'basic' objects whose identity is primitive and irreducible—(D2) does not provide a fully informative account of what distinguishes one direction from another.) One-level criteria are not inherently subject to this limitation, which suggests that they may in any case have to be invoked at some stage whenever two-level criteria are themselves invoked. This inevitably provokes a query as to whether two-level criteria are really needed at all, that is, as to whether the work which they do might not be equally well effected by one-level criteria. For unless there are compelling reasons for supposing that two-level criteria provide an indispensable service, considerations of simplicity and parsimony urge us in the direction of regarding one-level criteria as constituting the canonical form. Before we explore this issue, however, one or two preliminary remarks are in order concerning the logical status and role of identity criteria quite generally.

6. The Logical Status and Role of Identity Criteria

The first thing to stress is that criteria of identity are, for present purposes, to be thought of as logico-metaphysical principles, rather than as heuristic

[70] But see Williamson, *Identity and Discrimination,* 116 ff., for a two-level proposal concerning personal identity.

or epistemic principles—they tell us, in Locke's words, 'wherein identity consists' for objects of a given kind,[71] *not* how we may set about discovering the truth or falsehood of an identity statement concerning such objects (though, obviously, they will not be totally irrelevant to the latter sort of issue).[72]

Secondly, identity criteria are not *definitions*—neither of *identity,* nor of *identity restricted to objects of a certain sort or kind* (for identity is univocal), nor even of the *sortal terms* for which they supply criteria.[73] Neither one-level nor two-level identity criteria are apt to provide definitions of the associated sortals ('direction', 'number', and so forth). For two-level criteria, as Frege recognized,[74] do not enable one to replace *all* occurrences of those sortals, only those in which they figure in functional expressions flanking an identity sign on both sides. And one-level criteria involve, as we have seen, reference to and indeed quantification over things of the very sort for which they provide a criterion, and accordingly presuppose some grasp of the associated sortals. (This is made quite explicit in the one-level criteria formulated above—(S1) and (E1)—in which the relevant sortal figures in the antecedent of the formula, instead of a restriction being imposed on the domain of quantification.) So, although it is true that criteria of identity can be construed as conveying semantic information about the sortal terms they relate to (and, certainly, a full grasp of the meaning of those sortal terms requires a grasp of their associated criteria of identity), they do not completely specify the meanings of those terms. This is a fact which, indeed, becomes obvious once it is realized that many *different* sortals are governed by the *same* criterion of identity. ('Cat' and 'dog', for example, are so governed, for cats and dogs both being kinds of animal, they necessarily both share the criterion of identity governing the sortal 'animal'. It would be hard indeed if 'that dog' and 'the animal in that cage' conveyed different identity criteria, given that they may refer to one and the same object.)

Thirdly and finally, I should emphasize that it is not enough for a criterion of identity for *F*s simply to state a logically necessary and sufficient condition for *F*-identity: it must state such a condition in an informative and, more particularly, in a *non-circular* way—by which I mean that a grasp of *F*-identity must not already be needed in order to understand what is involved in the satisfaction of the condition in question.[75] As we saw earlier, Davidson's one-level criterion of identity for events, (E1), fell foul of this requirement.

[71] Locke, *Essay,* 335.

[72] Cf. my *Kinds of Being,* 15 f.

[73] Cf. ibid. 22 ff., and Williamson, *Identity and Discrimination,* 148 ff.

[74] Frege, *The Foundations of Arithmetic,* 77 ff.

[75] Cf. my *Kinds of Being,* 20 f.

7. One-Level Versus Two-Level Identity Criteria

Let us now return to the issue of whether two-level identity criteria are dispensable. One obvious thought is that they may be capable of reformulation in one-level style. (The reverse could not in general be true, in view of our remarks towards the end of section 5.) Consider (D2), then, the Fregean criterion of identity for directions, which tells us that the direction of line x is identical with the direction of line y if and only if lines x and y are parallel with one another. Why not reconstrue this in one-level style as the principle that directions are identical just in case any lines of which they are the directions are parallel with one another?[76] That is:

(D1) $(\forall x)(\forall y)((\text{Direction}(x) \,\&\, \text{Direction}(y)) \rightarrow (x = y \leftrightarrow (\forall w)(\forall z)((\text{Line}(w) \,\&\, \text{Line}(z) \,\&\, \text{Of}(x, w) \,\&\, \text{Of}(y, z)) \rightarrow w \,//\, z)))$.

It may be objected that (D1) cannot strictly say the same thing as (D2) because it exploits new terminology in the form of the expression 'Of' (which expresses the relation between a direction and a line of which it is the direction).[77] But, first, exact synonymy is not our target anyway, or else there would be no real advantage in trying to 'reconstrue' two-level criteria in one-level terms. And, second, we might in any case urge that the meaning of 'Of' must be implicitly grasped by anyone who can understand the functional expression 'the direction of x', which is symbolized in (D2) by 'dx'. Here, however, it may be further objected that, indeed, 'Of(x, w)' in (D1) is *only* to be understood as a paraphrase for 'dw = x', so that it is an illusion to suppose that (D1) really dispenses with such functional expressions.[78] But it is not at all clear to me that this suggestion is correct—and we have in any case noted already (in section 3) that the possibility of paraphrase does not of itself establish semantic priority (because paraphrase is a symmetrical relation).

Other objections may perhaps be raised against the attempt to reconstrue (D2) as (D1), though I shall not pursue them here.[79] I must however reject Timothy Williamson's charge that the Fregean approach of (D2) can, whereas the one-level approach of (D1) cannot, explain why directions and lengths have *different* criteria of identity. According to Williamson, the explanation is that they do so 'because two lines can have

[76] Cf. my 'What Is a Criterion of Identity?'.

[77] Cf. Williamson, *Identity and Discrimination,* 146 f.

[78] Cf. ibid.

[79] But see further my 'One-Level Versus Two-Level Identity Criteria', *Analysis,* 51 (1991), 192–4.

the same direction and different lengths, or *vice versa*'.[80] But in reality this is no explanation at all, for if it were correct parity of reasoning would require us to say that *heights* and *widths* must have different criteria of identity because two plane figures can have the same height and different widths, or *vice versa*—yet heights and widths are both kinds of lengths, being vertical and horizontal lengths respectively, and so must in fact share the *same* criterion of identity, namely, that of lengths in general. (Observe that this doesn't imply that any height can be *identified* with any width, any more than the fact that cats and dogs share the same criterion of identity implies that any cat can be identified with any dog.) As to the question of what then *is* the correct explanation for the fact that directions and lengths have different criteria of identity, I can only say that the search for an *explanation* of this sort of fact seems to me misplaced from the outset: criteria of identity are built into the very sense of sortal terms, so that to ask why things of the sort which a sortal term denotes are governed by the criterion which it conveys is comparable to asking, absurdly, why the sort of thing which it denotes is the sort of thing that it is.

The case of directions is not, however, of enough intrinsic importance for a great deal to hang upon it (Frege himself only introduced it for illustrative purposes). It would be more interesting and potentially fruitful to explore a more fundamental case, such as that of the criterion of identity for cardinal numbers. However, we should bear in mind that what is ultimately at issue is whether two-level identity criteria are dispensable—and to demonstrate that if they are it is not necessary to show that they can always be *reconstrued* in one-level terms. Rather, it may suffice to show that we can always supply an adequate one-level criterion *in place of* any two-level criterion—for one criterion of identity is all that we need for any given kind of objects—especially if we can also *derive* any correct two-level criterion from an adequate one-level criterion, perhaps with the aid of other necessary truths or definitions. (As we shall see, however, matters may not end quite there, since questions of epistemological and semantic priority may still remain outstanding.)

8. On the Identity of Cardinal Numbers

Consider, then, the case of cardinal numbers. (I should stress that in what follows we shall only be concerned, as Frege himself was, with cardinals no larger than the smallest transfinite cardinal.) What might a one-level criterion to replace Frege's (N2) look like? Here is a possibility:

[80] Timothy Williamson, 'Fregean Directions', *Analysis,* 51 (1991), 194–5: see 195.

(N1) $(\forall x)(\forall y)((\text{Number}(x) \,\&\, \text{Number}(y)) \rightarrow (x = y \leftrightarrow (\forall z)(\text{Number}(z) \rightarrow (\text{Precede}(z, x) \leftrightarrow \text{Precede}(z, y)))))$

In words: if x and y are cardinal numbers, then x is identical with y if and only if all and only the cardinal numbers preceding x also precede y (precede, that is, in the series of cardinal numbers $\langle 0, 1, 2, 3, \ldots \rangle$). Of course, (N1) is 'impredicative'—but only in the harmless way in which (S1) is. No vicious circularity ensues. Criterion (N1) serves to identify 0 unambiguously as the cardinal number which has no predecessors (compare the empty set) and to identify all succeeding cardinal numbers in a recursive fashion: thus 1 is the cardinal number which has as its sole predecessor the cardinal number which has no predecessors, that is, 0—and so on. It is indisputable that (N1) cannot of itself convey the meaning of the sortal term 'cardinal number' to anyone not yet possessed of the concept, and so cannot be taken as providing anything like a definition of this term—but that, as we have seen, should not be regarded as part of the function of a criterion of identity in any case.

An interesting question to raise now is this: can we recover Frege's principle (N2) from (N1), supplemented with some further necessary truths or definitions? It appears that we can. First we need to define functional expressions of the sort used in (N2), 'Nx: Fx'—'the number of Fs'. The obvious thing to say is that the number of Fs is the cardinal number the set of whose predecessors is one-to-one correlated with the set of Fs. More formally, we may adopt the following definition:

(Def N) $\text{N}x\text{: } Fx =_{\text{df}} (\iota y)(\text{Number}(y) \,\&\, (\exists R)(\{z\text{: Number}(z) \,\&\, \text{Precede}(z, y)\} \text{ 1–1}R \{x\text{: } Fx\}))$.

In (Def N), I have used 'ι' for Russell's definite description operator, so that '$(\iota y)(\ldots y \ldots)$' means 'the object y such that $\ldots y \ldots$' and is analysed in Russell's way, according to which (in plain English) 'The object y such that $\ldots y \ldots$ is thus and so' is taken as being equivalent to 'There is one and only one object y such that $\ldots y \ldots$ and y is thus and so'. If in addition to (Def N) we adopt the existence postulate that there *is* a cardinal number which is the number of Fs, for any condition F (subject to certain necessary restrictions discussed below), that is:

(N*) $(\forall F)(\exists y)(\text{Number}(y) \,\&\, \text{N}x\text{: } Fx = y)$,

then we are in a position to derive Frege's principle (N2). That is to say, (N1) in conjunction with (Def N) and (N*) entails (N2) (see further the Appendix to this chapter). Or, in plain English, *given* that cardinal numbers are identical just in case they have the same predecessors, that the number of Fs is the cardinal number the set of whose predecessors is one-to-one

correlated with the set of *F*s, and that there *is* a cardinal number which is the number of *F*s (and likewise a cardinal number which is the number of *G*s), it *follows* that: [Frege] the number of *F*s is identical with the number of *G*s if and only if the set of *F*s and the set of *G*s are one-to-one correlated.

9. Cardinal Numbers and Counting

But what precisely does the foregoing result serve to show? One's view of that will depend on what semantic and epistemological status one takes Frege's criterion (N2) to have. Is it a principle which has to be grasped by anyone aspiring to a basic knowledge of the cardinal numbers and so of elementary arithmetic? It is not clear to me that it is.[81] Consider this: when children begin to learn about number they do so by learning to *count*. But what *is* 'counting'? It is a process of establishing a one-to-one correlation between a set of objects (for instance, the books on a certain shelf) and the set of predecessors of a certain cardinal number: a task which is accomplished by singling out each object just once (often by pointing to it) and uttering a numeral in sequence until every object has been accounted for. (In practice, of course, we don't say 'zero' but rather 'one' as we point to the first object, but that is purely a matter of convention: the upshot is still that when we have finished the counting process we 'reach' a number which is the number of the objects being counted, in the sense just defined—that is, a number the set of whose predecessors is one-to-one correlated with the set of objects in question. It is arbitrary whether by 'reaching 3' we mean uttering the sequence of numerals '0', '1', '2' or—as is conventional—uttering the sequence of numerals '1', '2', '3'.) Now, counting provides us with a means whereby to establish the *equinumerosity* of two sets of objects—for example, the books on a shelf and the children in a class—relying on the fact that one-to-one correlation is transitive. Such equinumerosity can sometimes be established directly (for instance, by giving each child one and only one book), but often this is impractical. It seems to me that the realization that one-to-one correlated sets of objects are *equinumerous* is a more sophisticated achievement than the simple ability to *count* sets of objects, and consequently that we should not expect a grasp of Frege's criterion of identity for cardinal numbers to lie at the heart of our basic understanding of number. Indeed, it is a

[81] But see Wright, *Frege's Conception of Numbers as Objects,* 117 ff., where an opposing view is expressed.

possible objection to Frege's approach that it gives no immediate insight into the relationship between cardinal numbers and the process of counting which is central to a child's induction into a grasp of the numbers.[82]

This discussion of counting takes us back to some of the issues of section 2. We remarked there that we can only meaningfully be asked to *count* objects when supplied with appropriate sortal specifications. We can now see more clearly why this is so. Counting a set of objects is a process of establishing a one-to-one correlation between those objects and the set of predecessors of a certain cardinal number, which is then designated the number of that set of objects. But this process demands that each object be identifiable and differentiable from the others: and supplying a criterion of identity for each such object (which is what a sortal specification will typically convey) normally enables this demand to be met. (Again, I set aside here certain complications concerning counting and identity which will be discussed in Chapter 3.) However, this should not be taken to preclude us from saying that *there are* objects that are uncountable even in principle: for example, the portions of gold, or the red things, currently present in this room. Incidentally, I remarked earlier that a restriction would have to be placed upon the postulate that for any condition *F* there is a cardinal number which is the number of objects satisfying that condition ((N*) of section 8). One reason why this is so is now clear: unless '*F*' supplies a concept conveying a criterion of identity for each object falling under it (or else the objects in question are 'basic' ones whose identity is primitive and irreducible), we cannot meaningfully assign those objects a number. Thus, where '*F*' means 'book on this shelf', there is no difficulty in supposing that there is a number which is the number of *F*s: but not so where '*F*' means 'red thing currently present in this room'. Observe, though, that even if '*F*' *does* supply a concept conveying a criterion of identity for objects falling under it, this does not guarantee that there is such a thing as the number of *F*s. For instance, 'set' supplies such a criterion in the form of (S1), and yet we know that there are 'too many' sets for there to be a number of them (though there may, of course, be a number of sets *meeting some further specified condition,* such as the number of thirteen-membered sets of cards that can be dealt from a fifty-two card pack).[83] Again, there is a criterion of identity governing portions of gold, and yet (as we saw in section 2) no number can meaningfully be assigned to the portions of gold currently present in this room (because mass terms like 'gold' fail to supply a principle of *unity* for their instances). So, stating

[82] For an extended discussion of this and related matters, not always consonant with the views expressed here, see Dummett, *Frege: Philosophy of Mathematics,* 143 ff.

[83] See e.g. A. W. Moore, *The Infinite* (London: Routledge, 1990), 147 ff.

an appropriate restriction on '*F*' in (N*) is no simple matter. How best to handle this problem I shall discuss no further here, beyond saying that one obvious strategy which will serve the purposes to which we put (N*) earlier is to replace (N*) by:

(N**) $(\forall F)((\exists G)(\exists R)(\{x\colon Fx\}\ 1\text{–}1R\ \{x\colon Gx\}) \rightarrow (\exists y)(\text{Number}(y)\ \&\ \text{N}x\colon Fx = y))$.

In words: if the *F*s are one-to-one correlated with the members of some set, then there is a cardinal number which is the number of *F*s.

10. Abstract and Concrete Objects

One important issue which I have postponed until now is that of the distinction between 'abstract' and 'concrete' objects. (As we shall see in Chapter 10, the epithet 'abstract' is not always used to register a difference from the 'concrete', though that is how I am understanding it at present.) I assume that numbers, sets and directions are uncontroversially abstract, while books and children are indisputably concrete. Of course, it may be asked how I *know* that numbers are abstract, when nothing I have said about them so far determines what they *are*. Indeed, it has been argued that numbers *could not* be 'objects' at all.[84] My own view is that the natural numbers, at least, are *sorts* or *kinds* (of sets) and so *a fortiori* abstract.[85] However, even if this is not accepted, perhaps we know enough about numbers to know that they would have to be abstract whatever they are—perhaps because there are too many of them for them to be concrete.

An obvious suggestion is that concrete objects are, while abstract objects are not, denizens of space-time (or, which perhaps amounts to the same thing, are/are not subject to causality).[86] This has been queried, however—for instance by Bob Hale[87]—on the grounds that objects such as *languages* are plausibly abstract and yet come into existence and undergo change and so presumably exist in time. (It won't do to classify them as abstract on the grounds that they *only* exist in time and not also in space—even if it were altogether plausible to say this of them—for we

[84] See Paul Benacerraf, 'What Numbers Could Not Be', in P. Benacerraf and H. Putnam, eds., *Philosophy of Mathematics: Selected Readings,* 2nd edn. (Cambridge: Cambridge University Press, 1983); but see also Wright, *Frege's Conception of Numbers as Objects,* 117 ff., for criticism.

[85] See my 'Are the Natural Numbers Individuals or Sorts?', *Analysis,* 53 (1993), 142–6, and Chapter 10 below.

[86] See e.g. Reinhardt Grossmann, *The Existence of the World: An Introduction to Ontology* (London: Routledge, 1992), 7.

[87] Hale, *Abstract Objects,* 49.

should want to classify immaterial Cartesian egos as 'concrete' despite ascribing only temporal, not spatial, existence to them.) Hale proposes instead, developing a suggestion of Harold Noonan's,[88] that abstract objects can be distinguished by reference to certain features of the criteria of identity which govern them. Specifically, he proposes:[89]

> (A4)*F* is an abstract sortal iff, for any *R* that grounds *F,* either (i) *R* cannot hold between spatially located items at all or (ii) *R* can hold between things which are spatially, but not temporally, separated

where *R* is an equivalence relation and

> *R grounds F* iff, for any statement of identity linking *F*-denoting terms, there is some statement to the effect that *R* holds among certain things, the truth of which is (logically) necessary and sufficient for the truth of that statement of *F*-identity.[90]

As an example of a grounding relation Hale cites the relation of parallelism between lines, which qualifies as such 'in virtue of the fact that lines have identical directions iff they are parallel'.[91] From this it appears that Hale is thinking primarily in terms of two-level ('Fregean') rather than one-level identity criteria (though he acknowledges that at least some sortals must be governed by one-level criteria,[92] and it is clear, indeed, that he intends (A4) to prescind from the distinction between one-level and two-level criteria).

Limitations of space prevent me from discussing the interesting reasoning behind Hale's ingenious proposal, but it appears in any case to be fatally flawed. This is most easily seen if one considers what it implies about *concrete* sortals (assuming that a sortal is 'concrete' if and only if it is not 'abstract'). Negating the right-hand side of (A4), we see that by Hale's account a sortal *F* qualifies as concrete iff there is some *R* that grounds *F* such that (i) *R* can hold between spatially located items and (ii) *R* cannot hold between things which are spatially, but not temporally, separated. Now consider the relation '*x* and *y* coincide in their boundaries'. This is clearly a relation which serves to 'ground' the abstract sortal 'part of a geometrical figure', for it is evident that if *x* and *y* are parts of a geometrical figure (for example, semicircular parts of a circle), then they are, of logical necessity, identical parts if and only if they coincide in their boundaries. However, this is a relation which *can* also hold between spatially

[88] See H. W. Noonan, 'Dummett on Abstract Objects', *Analysis,* 36 (1976), 49–54, and 'Count Nouns and Mass Nouns', *Analysi* s, 38 (1978), 167–72.

[89] Hale, *Abstract Objects,* 61. The numbering is Hale's.

[90] Ibid. 59.

[91] Ibid.

[92] Ibid. 57.

located items (for instance, Switzerland coincides in its boundaries with the mereological sum of its cantons), but cannot hold between things which are spatially separated (and so *a fortiori* cannot hold between things which are spatially, but not temporally, separated). By Hale's account, therefore, the sortal 'part of a geometrical figure' is wrongly classified as concrete. (To this it might perhaps be objected that the sense in which *concrete* objects, such as pieces of terrain, may 'coincide in their boundaries' is different from the sense in which *abstract* objects, such as geometrical figures, may do so: but that presupposes that the distinction between abstract and concrete entities has already been satisfactorily drawn.)

However, rather than attempt to refurbish Hale's proposal, let us look again at the previous suggestion that abstract objects are those that are not denizens of space-time. The supposed difficulty was that objects such as languages are plausibly abstract and yet also plausibly come into existence and undergo change. But perhaps we need to make a distinction, which can best be brought out by analogy with a related case, that of biological species. These too are said to come into existence and undergo change—indeed, that they do so is crucial to the theory of evolution. How then can species names denote universals, which are abstract entities and so on the present proposal timeless? The solution is to distinguish between biological *species,* which are *concrete particulars* consisting at any time of the mereological sum of their currently existing members (individual tigers or individual oaks), and biological *sorts* or *kinds,* which are universals instantiated by the members of those species.[93] Thus we can say that the horse *species* at one time did not exist and has evolved over millennia as its individual members have gradually taken on different morphological features, but that the *kind* horse which all of these past and present individual horses instantiate never 'came into' existence and has not itself undergone change. In like manner, we may say that 'English', construed as denoting a kind of language, does not refer to an ephemeral and changeable entity, but that what have come and gone and been subject to change are the concrete processes of linguistic communication which, over the centuries of English history, have all qualified as manifestations of English. On this view, in as much as 'English' denotes something abstract it denotes a *kind* (a universal), not a particular. To the extent that we happily identify various *sub*-kinds of Englishsuch as American English and Old English—this view seems reasonable, since only kinds (not particulars) can have sub-kinds.

[93] See my 'Noun Phrases, Quantifiers, and Generic Names', and cf. D. L. Hull, 'Are Species Really Individuals?', *Systematic Zoology,* 25 (1976), 174–91. See also Chapter 8 below.

11. The Paradoxes of Identity Over Time

This is a convenient place to address a final issue, which concerns the problem of *identity over time* and the paradoxes to which identity criteria often appear to give rise when time is brought into the picture. (There are also analogous *modal* paradoxes which, however, I shall not discuss here.)[94] The paradoxes arise because the identity criteria that we are intuitively led to adopt for various kinds of objects which persist through time permit these objects to change in certain respects while remaining numerically the same objects, and yet a series of small and acceptable changes can add up to a large change which we may intuitively feel to be incompatible with the retention of numerical identity for the object concerned. (Such paradoxes are, then, ostensibly a variety of Sorites paradox.) In short: identity over time must be a *transitive* relation, and yet our intuitive identity criteria for objects persisting through time seem to rely on relations which are not strictly transitive.

For instance: we want to allow that a *ship* can persist identically through a small change in its component parts and a small change in its overall design or structure, but a great many such successive changes may transform it into an object made of completely different materials put together in a completely different way—so that what we eventually have is no longer a ship at all, and so *a fortiori* not the *same* ship as the one we started with. Similar points have been made about languages (ignoring for the moment the bearing of my earlier denial that these may literally undergo change when conceived of as abstract entities). For example,[95] the language now spoken in Rome has (we may suppose) developed by small step-by-step changes from the language which was spoken in ancient Rome, such that no one of those changes amounted to the extinction of one language and the birth of a new one—and yet modern Italian is not numerically the same language, surely, as ancient Latin.

To cope with these problems we might attempt to refurbish what we take to be the intuitive identity criteria for artefacts such as ships and languages, substituting strictly transitive relations for the non-transitive ones supposedly causing the trouble.[96] But before taking such drastic action we should explore the possibility that the problems are spurious ones, arising from a confusion between the identity criteria for individuals falling under given sortal concepts and the conditions for the correct application of

[94] But see my 'On a Supposed Temporal/Modal Parallel', *Analysis,* 46 (1986), 195–7, and Williamson, *Identity and Discrimination,* 126 ff.

[95] See Williamson, *Identity and Discrimination,* 137.

[96] Cf. ibid., 139 ff.

those sortals to individuals. We need, I suggest, to allow for the possibility of *metamorphosis,*[97] that is, a process whereby one and the same individual object can persist through a transformation from being an object of one sort *F* to being an object of another sort *G,* such that no object can *simultaneously* be both an *F* and a *G.* (I shall discuss this phenomenon more fully in Chapter 8.) A logical restriction on such change is that *F* and *G* should supply the same criterion of identity for individuals instantiating them. (I set aside, here, the special case of 'basic' objects, for which no such criteria are forthcoming.) But we have already noticed that very different sortal concepts can indeed convey the same identity criteria—for instance, the concepts *cat* and *dog*—and indeed that all sortals falling under the same higher-level sortals (as *cat* and *dog* both fall under *animal*) must, on pain of contradiction, supply the same identity criteria for individuals instantiating them. There can, thus, be no *logical* objection to the possibility of an individual animal surviving a change from being a cat to being a dog, even if such a transformation is *physically* impossible for biological reasons. In the case of artefacts like ships and languages such physical restraints are absent and hence 'metamorphosis' may be expected to be a more common phenomenon amongst them. Thus, we can consistently react to the Italian/Latin example discussed earlier by saying that the same individual language has persisted identically in Rome from ancient to modern times, but that in the course of history it has changed from being an instance of the language-type *Latin* to being an instance of the language-type *Italian*—where these language-types are defined by certain important lexical and syntactic features. (It should be observed that this reaction is consistent with my earlier proposal that, to the extent that language-names such as 'Latin' and 'Italian' denote abstract entities, they denote kinds or types rather than individuals; furthermore, it may be conceded that the boundary between Latin and Italian is not a sharp one, and even that some sub-kinds of Latin equally qualify as sub-kinds of Italian.) Similarly, one and the same individual artefact might change from being a ship to being a hotel, provided both sortals convey the same criterion of identity.

If this solution is correct, the lesson would be that it is an error to suppose that the criterion of identity for, say, artefacts of a given sort necessarily embodies within it a condition to the effect that such an individual can only persist *as an individual of that sort.* We need to distinguish between the diachronic *identity*-conditions of individuals and the conditions for their persistence as individuals *of a given sort* (what we might call

[97] See also my *Kinds of Being,* 103 f.

'*sortal* persistence conditions').[98] Once this distinction is drawn, I surmise, many of the supposed temporal paradoxes of identity will dissolve, since they present no challenge to the transitivity of *identity* and only serve to demonstrate that 'metamorphosis' is possible and indeed quite common. (There are indeed puzzle cases, like that of the ship of Theseus, which genuinely concern identity and cannot be handled in the way just proposed: but I believe that most such puzzles are independently soluble in a relatively straightforward fashion.)[99] Of course, it may be said that we were already familiar with the possibility of metamorphosis from the case of transformations like that of a caterpillar into a butterfly or that of a tadpole into an adult frog; but in fact such transformations are not true cases of metamorphosis as I presently understand that term, because count nouns such as 'caterpillar' and 'tadpole'—like also 'boy' and 'sapling'—are what David Wiggins has called *phased* sortals, describing an individual as it is during one period of its natural development.[100] True (or, as I shall call it in Chapter 8, *radical*) metamorphosis—for instance that of a cat into a dog or that of a human being into a frog—would not be a natural process, nor can 'cat' and 'human being' properly be called phased sortals.

Appendix: Informal Proof of (N2)

We want to show that (N2) follows from the conjunction of (N1), (Def N), and (N*) (see section 8). Suppose, then, that

(i) $\mathrm{N}x\colon Fx = \mathrm{N}x\colon Gx,$

that is, the number of *F*s is identical with the number of *G*s. Then, by (Def N), this implies that there is a number y the set of whose predecessors is one-to-one correlated with the set of *F*s, and a number w the set of whose predecessors is one-to-one correlated with the set of *G*s, and $y = w$. If $y = w$, then by (N1) —indeed, by Leibniz's law—y and w have exactly the same predecessors, and since we are given that the set of these predecessors is one-to-one correlated both with the set of *F*s and with the set of *G*s, it follows by the transitivity and symmetry of one-to-one correlation that the set of *F*s is one-to-one correlated with the set of *G*s, that is:

(ii) $(\exists R)(\{x\colon Fx\}\ 1\text{–}1R\ \{x\colon Gx\})$

[98] Cf. my 'Real Selves: Persons as a Substantial Kind', in D. Cockburn, ed., *Human Beings* (Cambridge: Cambridge University Press, 1991), 93 f., my *Subjects of Experience,* ch. 2, and Chapter 8 below.

[99] See my 'On the Identity of Artifacts', *Journal of Philosophy,* 80 (1983), 220–32.

[100] See Wiggins, *Sameness and Substance,* 24.

So (ii) follows from (i) and hence (N2) holds in the left-to-right direction. Next, assume for the converse that (ii) is true. Now, by (N*) we have that there is a number *y* which is the number of *F*s and a number *w* which is the number of *G*s. That is to say, by (Def N), we have that there is a number *y* the set of whose predecessors is one-to-one correlated with the set of *F*s, and also a number *w* the set of whose predecessors is one-to-one correlated with the set of *G*s. But by (ii) we have that the set of *F*s is one-to-one correlated with the set of *G*s, whence it follows by the transitivity and symmetry of one-to-one correlation that the set of *y*'s predecessors is one-to-one correlated with the set of *w*'s predecessors. From this it follows that *y* and *w* have exactly the same predecessors, and consequently by (N1) that *y* and *w* are the same number. But *y* and *w* are, respectively, the number of *F*s and the number of *G*s, which are therefore also identical, so that (i) follows and consequently (N2) holds in the right-to-left direction. *QED.* (Note that the proof will equally go through with (N**) of section 9 replacing (N*). It is crucial to the proof, incidentally, that—as was stated at the beginning of section 8—we are concerned with cardinals no larger than the smallest transfinite cardinal.)[101]

[101] For background information, see Moore, *The Infinite,* 147 ff.

3 Identity and Unity

In the previous chapter, I introduced the notion of an object as an entity possessing determinate identity-conditions, but at the same time left room for the recognition of entities lacking this status. As I put it there, not everything is a *thing*. In the present chapter I shall say more about such entities. In fact, I shall be proposing a fourfold categorization of entities according to whether or not they possess determinate identity-conditions and whether or not they are determinately enumerable or countable. Some entities—which I call 'individual objects'—have both determinate identity and determinate countability: for example, persons and animals. In the case of entities of a kind *K* belonging to this category, we are in principle always entitled to expect there to be determinate answers to such questions as 'Is *x* the same *K* as *y*?' and 'How many *K*s are there satisfying condition *C*?', even if we may sometimes be unable in practice to discover what these answers are. But other entities apparently lack either determinate identity, or determinate countability, or both. In these terms I shall try to explain certain important ontological differences between familiar macroscopic objects and various rather more esoteric entities, such as the particles of quantum physics, quantities of material stuff, and tropes or property instances. I call entities which have determinate countability but not determinate identity, 'quasi-objects': electrons provide a plausible example. Entities which have determinate identity but not determinate countability, such as quantities of stuff, I call 'quasi-individuals'. Finally, I call entities which have neither determinate identity nor determinate countability, 'non-objects', a possible example of these being provided by tropes, such as the particular sphericities of individual spherical objects. Whether or not our empirical theories ultimately embrace any of these somewhat esoteric entities, I want to argue that analytic metaphysics can serve a valuable purpose by articulating a categorial framework which renders their possibility perspicuous and thereby helps us to make sense of theorists' attempts to posit their existence.

1. More About 'Objects'

As we saw in the previous chapter, 'object' or 'thing' is a slippery term in the mouths of philosophers, who often use it in restricted senses without

making explicit the restrictions that they have in mind. We saw that one way in which this fact can be brought out is by reflecting on the difference between the trivial logical truth that every *thing* is a thing and the altogether more contestable, metaphysically substantive claim that *everything* is a thing. In English, at least, the seemingly minor syntactical difference between the free-standing use of the word 'thing' and its use in conjunction with the words 'every' and 'some' to form the quantifiers 'everything' and 'something' marks a semantic difference of great moment. When Quine famously replied to his own question, 'What is there?', with the single word, 'Everything', it was crucial to the plausibility of his answer that he did not split this single word into two.[102] Partly for this reason, then, I shall continue to use the semi-technical term 'object' in preference to the colloquial term 'thing': having less currency in ordinary language, it brings with it fewer distracting associations.

Grammatically, the word 'object' is a *count noun*: it forms a plural, 'objects', and we can, without syntactical impropriety, construct complex noun phrases combining this plural noun with numerical adjectives—such as 'five objects'. But it is often pointed out, quite correctly, that in such a context the term 'object' does not function as a genuine sortal term, like 'book' or 'tiger': it is merely what David Wiggins has called a *dummy* sortal.[103] This is because a genuine sortal, such as 'book', typically conveys—in the terminology of Michael Dummett—both a criterion of *application* and a criterion of *identity*.[104] A full grasp of the meaning of the term 'book' involves not only an understanding of what kind of items it applies to but also an understanding of the identity-conditions of items of that kind. By the 'identity-conditions' of items of a kind *K,* I mean the truth-conditions of identity statements of the form '*x* is the same *K* as *y*'. Very often, when we can meaningfully speak of the identity-conditions of items of a kind *K,* we are able, in principle, to state those conditions in an *informative* way: and such an informative statement of the identity-conditions of *K*s is precisely what a criterion of identity for *K*s provides. By 'informative', here, I mean at least 'non-trivial and non-circular'. In this sense, the Axiom of Extensionality of set theory constitutes a paradigm example of a criterion of identity, in this case for *sets*. It states that if *x* and *y* are sets, then *x* is the same set as *y* if and only if *x* and *y* contain exactly the same members. Since we can, in principle, determine the membership of sets *x* and *y* without prior appeal to the identity or diversity of those sets, the axiom provides a non-trivial and non-circular statement of their identity-conditions,

[102] See W. V. O. Quine, 'On What There Is', in his *From a Logical Point of View,* 1.

[103] See David Wiggins, *Sameness and Substance,* 63–4.

[104] See Michael Dummett, *Frege: Philosophy of Language,* 74–5.

thus qualifying as a criterion of set-identity. However, we should certainly leave open the possibility that there are kinds *K* for which identity statements of the form '*x* is the same *K* as *y*' are meaningful, and determinately either true or false, even though no *criterion* of identity for *K*s can, even in principle, be supplied.[105] For items *x* and *y* of such a kind *K,* there will always be a *fact of the matter* as to their identity or diversity, even if there is no non-trivial and non-circular way of stating the identity-conditions of such items. Items such as these, then, will have *determinate identity,* but no determinate *criterion* of identity. Are there, in fact, any such items? I myself believe so, holding *persons* to fall into this category.[106] I believe that there is always a fact of the matter as to the identity or diversity of persons, but no non-trivial and non-circular criterion of personal identity. However, to return to the point that 'object' is not a genuine sortal term: the lesson is that 'object' is, as we might put it, *transsortal* in its application. That is to say, it may be applied to *any* item falling under a sortal concept, no matter what specific identity-conditions may belong to items of that kind. Books and tigers, for example, have very different identity-conditions, but both may be categorized as 'objects', albeit as objects of very different kinds. But precisely because the term 'object' does not import any *one* set of identity-conditions for the items to which it applies, it does not qualify as a genuine sortal term. To be an *object,* we might say, is to be an item belonging to *some* kind *K,* instances of which have determinate identity-conditions: but just what those identity-conditions are will depend on what kind *K* is.

2. Identity and Countability

Earlier I remarked that 'object' is *grammatically* a count noun, in that there is no syntactic impropriety in constructing complex noun phrases such as 'five objects'. However, because 'object' carries with it no *specific* information about identity-conditions, it is impossible to use the phrase 'five objects' in a sentence to convey significant numerical information without at least an implicit understanding of what *kind* or *kinds* of objects are being enumerated. As we saw in the last chapter, to be told that there are five *objects* in a certain room is really to be told nothing of substance until some sortal characterization of the objects in question has been given: as it might be, five *books,* or four *books* and one *tiger*. These considerations

[105] See further my *Kinds of Being,* 20–1.

[106] See further ibid. 121 ff., and my *Subjects of Experience,* 41 ff.

might lead one to suppose that only items possessing determinate identity-conditions—what I have so far been calling 'objects'—are countable, as well as that they are only countable in the light of some sortal characterization of them. But that supposition—although I did not challenge it in the previous chapter—certainly is challengeable: and I shall be challenging it in what follows. Identity and countability are, I believe, relatively independent notions. What I *am* prepared to accept is that where we are dealing with items that *do* have determinate identity-conditions—that is, with items which are 'objects' and which consequently fall under sortal concepts—our counting of them has to have proper regard to their identity-conditions, in the following sense: when we are counting *K*s, where *K*s are items possessing determinate identity-conditions, each *K* should count for one and no *K* should be counted twice. For example, if we are asked to count the books in a certain room, we should count each book once and no book more than once. Here the task of counting is to be achieved by establishing a one-to-one correspondence between the books in the room and the series of natural numbers from 1 to *n,* for some number *n*. If each book in the room can be paired with just one number in the series, then we can say that there are precisely *n* books in the room.

Of course, we should acknowledge that there are certain perfectly respectable, but non-standard, ways of 'counting' which do not observe this principle. For instance, for certain purposes I may count two different books 'as one', because they are just different copies of the same work or text. But then it seems to me that this non-standard counting of *copies* really just amounts to a standard counting of *texts*. That is to say, what such a non-standard counting procedure reveals is that one is not 'really' counting the items one purports to be counting, but items of *another kind*: in the example, not 'books' in the sense of physical objects (what I have just called 'copies'), but 'books' in the sense of authorial productions (what I have just called 'works' or 'texts'). At least, so it seems to me. But if this interpretation is not liked, for whatever reason—maybe because one has an aversion to 'abstract' objects and believes that 'texts' in my sense would have to be abstracta—then one could simply say, instead, that *standard* counting procedures should invoke one-to-one correspondence where items possessing determinate identity-conditions are concerned, and take this as being definitional of what constitutes a 'standard' counting procedure in such cases. What is of more concern to me at present is the presumption that *only* items possessing determinate identity-conditions may be counted, whether 'standardly' or 'non-standardly'. For I think that such a presumption is mistaken, as I shall now try to explain with the aid of a quantum-mechanical example.

3. Countability Without Determinate Identity

Here is a putative example of countability without determinate identity. The single electron shell of a neutral helium atom contains precisely two electrons: and yet, apparently, there is no determinate fact of the matter as to the identity of those electrons. This is because the two electrons in the atom's shell exist in a state of so-called 'superposition', or 'quantum entanglement'. Our inability to say which electron is which is not merely due to our ignorance, or inability to 'keep track' of an electron in such circumstances: not even God could say which electron was which, because there is simply *no fact of the matter* about this. It is well known, indeed, that the sort of indeterminacy presupposed by orthodox interpretations of quantum theory is more than merely epistemic in nature—it is *ontic*. What this means, then, is that an identity statement of the form '*x* is the same electron as *y*' may simply not be either determinately true or determinately false. Note that I say 'may'. I do not want to suggest that statements of this form *never* have determinate truth-values. What does appear to be the case, however, is that electrons do not possess determinate identity 'across' states of superposition or entanglement. For example, if a single free electron, which we could label '*a*', were to be captured by a helium ion—entering a state of entanglement with the single electron already present in the ion's shell—and subsequently a single electron which we could label '*b*' were to be released by the atom, then it seems that there would be no fact of the matter as to the truth or falsehood of the statement '*a* is identical with *b*'. At least, this, as I understand it, is the implication of current thinking in quantum theory. But my concern at present is not so much whether quantum theorists are, or would be, *correct* in taking such a view, but rather whether such a view is at least coherent and intelligible. I think it is. But if it is, then it shows that there can be determinate countability even where there is not determinate identity: for it is not in dispute that there are precisely and determinately *two* electrons in the shell of a neutral helium atom, even though there is no determinate fact of the matter as to the identity of those electrons.

I should stress that it would be wrong to assume that quantum theory poses problems for the synchronic individuation and diachronic identity of electrons *quite generally,* and hence casts doubt upon the legitimacy of our description of the preceding example in terms of an identifiable electron *a* existing prior to the interaction and an identifiable electron *b* existing subsequent to it.[107] Here it is important to note that electrons are

[107] It is true that some philosophers of quantum physics would agree with Michael Redhead that quantum field theory is best understood purely in terms of 'quantized excitations of a field': see Michael Redhead, 'A Philosopher Looks at Quantum Field Theory', in H. R. Brown and R. Harré, eds., *Philosophical Foundations of Quantum Field Theory* (Oxford: Clarendon Press, 1988), 18. But even Redhead considers that it is perfectly *intelligible* to interpret quantum phenomena in the more familiar way, in terms of individual particles: see Steven French and Michael Redhead, 'Quantum Physics and the Identity of Indiscernibles', *British Journal for the Philosophy of Science,* 39 (1988), 233–46, and Michael Redhead and Paul Teller, 'Particle Labels and the Theory of Indistinguishable Particles in Quantum Mechanics', *British Journal for the Philosophy of Science,* 43 (1992), 201–18. The intelligibility of such more familiar interpretations is all that currently concerns me, not the deeper question of whether particle or field interpretations are superior on grounds of parsimony and the like.

fermions (as opposed to *bosons,* a class of particles exemplified by photons) and consequently do appear to have determinate identity attributable to them both *at* a time and, I believe, even *over* time when they are not interacting with other particles in such a fashion that they enter into an 'entangled' or 'superposed' state. What distinguishes fermions from bosons is that only the former are governed by the Pauli Exclusion Principle (the principle that no two fermions of the same kind in any system can be in the same quantum state). This is the principle which ensures, for instance, that a lithium atom must have its third electron in a second shell at a different energy-level from the innermost two, which differ only in their direction of spin.[108]

4. Evans's Argument Against Vague Identity

Now, the notion that vagueness or indeterminacy of identity might reside *in the world*—as opposed to residing, merely, in our descriptions or knowledge of the world—has been vigorously challenged by many philosophers, most notably Gareth Evans, so I should say something in response to this sort of challenge here.[109] Let us turn, then, to Evans's well-known paper, 'Can There Be Vague Objects?', in which he argues that no identity

[108] For technical details and illuminating discussion, see Bas C. van Fraassen, *Quantum Mechanics: An Empiricist View* (Oxford: Clarendon Press, 1991), chs. 11 and 12. Van Fraassen's verdict on the question of whether elementary particles can be individuated in quantum-theoretical terms is that 'the answer is *yes* for fermions and *no* for bosons' (480). I am indebted to a paper by Peter Simons for alerting me to the importance of the fermion/boson distinction in the present context: see his 'Particulars in Particular Clothing: Three Trope Theories of Substance', *Philosophy and Phenomenological Research,* 54 (1994), 553–75.

[109] See also my 'Vague Identity and Quantum Indeterminacy', *Analysis,* 54 (1994), 110–14. For another recent response to Evans, with which I am in some sympathy, see Terence Parsons and Peter Woodruff, 'Worldly Indeterminacy of Identity', *Proceedings of the Aristotelian Society,* 95 (1995), 171–91. See also van Inwagen, *Material Beings,* 244 ff., For a discussion of van Inwagen's position, see David Cowles, 'On van Inwagen's Defense of Vague Identity', in James E. Tomberlin, ed., *Philosophical Perspectives,* 8: *Logic and Language* (Atascadero, Calif.: Ridgeview, 1994), 137–58.

sentence '$a = b$' (where 'a' and 'b' are singular terms) can be of indeterminate truth-value. Since the issue is whether vagueness can reside in the world rather than merely in language, I take him to mean by this that for any entities a and b there cannot fail to be an objective fact of the matter as to whether or not they are identical. As we have just seen, the deliverances of modern quantum physics would appear to be at odds with this claim, so we need to look carefully at Evans's attempted proof of it.

Evans proposes that we 'allow for the expression of the idea of indeterminacy by the sentential operator "∇"'. Thus, on the supposition that '$a=b$' is of indeterminate truth-value, we have, he says, the premiss

(1) $\nabla(a = b)$.

Evans takes (1) to entail

(2) $\hat{x}[\nabla(x = a)]b$,

ascribing to b the property '$\hat{x}[\nabla(x = a)]$', that is, the property of being such that it is indeterminate whether it is identical with a. But supposedly we also have as a logical truth

(3) $\neg \nabla(a = a)$

asserting that it is not indeterminate whether a is identical with a, which Evans likewise takes to entail

(4) $\neg\hat{x}(\nabla(x = a)]a$

denying that a possesses the property of being such that it is indeterminate whether it is identical with a. However, by Leibniz's law, we may derive from (2) and (4)

(5) $\neg(a = b)$

asserting the non-identity of a and b, thus 'contradicting the assumption, with which we began, that the identity statement "$a = b$" is of indeterminate truth value'.

Evans's conclusion clearly conflicts with the quantum-theoretical verdict that, in our electron example, there may simply be no objective fact of the matter as to whether or not the released electron b is identical with the captured electron a. Now, of course, the accepted principles of quantum mechanics may be wrong and in the future a superior theory of sub-atomic phenomena may show that there *must,* after all, be an objective fact of the matter as to whether or not our electrons a and b are identical. But it is surely clear that Evans's argument will not contribute in any way to the founding of any such new theory. I make this point in order to emphasize that my proposed counterexample to Evans's claim does not

really depend for its force upon the *correctness* of current quantum theory or of its standard interpretation: it is enough that *it makes sense* to suppose that there is no objective fact of the matter in the case envisaged, that is, it is enough that Evans's argument cannot impugn the *coherence* of currently accepted views.

Where, then, can Evans's argument have gone wrong? At least the following five possibilities (not all of them mutually exclusive) suggest themselves. (i) It is improper to express indeterminacy by a sentential operator like '∇', that is, it is wrong to treat the *lack* of any objective fact of the matter determining the truth or falsity of a sentence *S*1 as itself being just a particular objective matter of fact capable of being reported by a true sentence *S*2 obtainable from *S*1 by a logical operation. (ii) It is mistaken to regard '$\hat{x}[\nabla(x = a)]$' as expressing a genuine *property* of any sort, that is, there can be no such thing as the 'property' an object has just in case there is no objective fact of the matter as to whether or not it is identical with the object *a*. (iii) It is incorrect to suppose that (1) entails (2) or that (3) entails (4). (I shall examine this possibility further in a moment.)[110] (iv) It is erroneous to assume that, whatever *a* may be, there must be an objective fact of the matter as to whether or not *a* is self-identical, that is, (3) cannot be assumed to be true. (I would be extremely loath to adopt this solution, however, as I shall explain in section 5 below.) Finally, (v) Leibniz's law requires some kind of restriction. (Again, I regard this as a solution of the last resort.)

There is something to be said in favour of adopting a combination of options (i) and (ii). For consider again our electron example. As we have seen, it seems perfectly coherent to suppose, with the quantum physicist, that there is no objective fact of the matter as to whether or not electron *a* is identical with electron *b*. According to Evans's argument, this leads to a contradiction: if what the quantum physicist supposes were true, then there *would* after all be an objective fact distinguishing *b* from *a,* namely, the 'fact' that *b* possesses, whereas *a* does not, the 'property' which an object has just in case there is no objective fact of the matter as to whether or not it is identical with *a*. But this 'fact' and this 'property' seem to be, to say the very least, of highly dubious status and completely without empirical significance. We might agree that *a* does *not* possess any such property, but hold this on the grounds that there *is* no such property and so *a fortiori* no such property to be possessed by *b* either.

[110] It is worth recording that elsewhere I have queried the apparent analogue of this supposed entailment in the standard 'proof' of the necessity of identity: see my 'On the Alleged Necessity of True Identity Statements', and my 'Reply to Baldwin on *De Re* Modalities', *Mind,* 94 (1985), 101–3.

However, I realise that many logicians—albeit, perhaps, not many quantum physicists—will be less ready than I am to deny that '$\hat{x}[\nabla(x = a)]$' expresses a genuine property of any sort. For these logicians I have an alternative diagnosis of the error in Evans's proof, which is a variant of option (iii) above. Suppose we concede that electron *b does* possess the supposed property '$\hat{x}[\nabla(x = a)]$', as stated in line (2) of Evans's proof. Then observe that parity of reasoning must lead us to say, equally, that electron *a* possesses the symmetrical property '$\hat{x}[\nabla(x = b)]$'. However, given the quantum physicist's assumption that there is no objective fact of the matter as to whether or not electron *a* is identical with electron *b,* it surely follows that the property '$\hat{x}[\nabla(x = a)]$' possessed by electron *b* is not determinately distinct from the symmetrical property '$\hat{x}[\nabla(x = b)]$' possessed by electron *a*: for these 'two' properties 'differ' only by permutation of *a* and *b*. Consequently, the possession by *b* of the property '$\hat{x}[\nabla(x = a)]$' cannot serve to differentiate *b* determinately from *a,* since that property is not determinately distinct from a property which is possessed by *a*. The formal error in the proof thus lies in line (4), and more particularly in its derivation from line (3). For if the property '$\hat{x}[\nabla(x = a)]$' is, for the reason just given, not determinately distinct from the property '$\hat{x}[\nabla(x = b)]$' which *is* possessed by *a,* it cannot be correct to *deny* that *a* has this property on purely logical grounds, that is, to derive this denial from the logical truth stated in line (3). (The technical implication of this diagnosis is that a formal restriction needs to be placed on the operation of property-abstraction, whereby from '$\neg\nabla(a = a)$' only '$\neg\hat{x}[\nabla(x = x)]a$' may be inferred.)

Let me sum up where we have got to so far, as follows. Evans asks us to suppose, for the purposes of his attempted reductio, that it is indeed indeterminate whether *a* is identical with *b* (1). From this he says it follows that *b* has the property of being such that it is indeterminate whether it is identical with *a* (2). At the same time, he contends, it is surely *not* indeterminate whether *a* is identical with *a* (3). And from this he says it follows that *a* does *not* have the property of being such that it is indeterminate whether it is identical with *a* (4). But then it transpires that *b* has a property which *a* lacks, namely, the property of being such that it is indeterminate whether it is identical with *a*. By Leibniz's law, however, this is enough to show that *a* and *b* are numerically distinct (5) and consequently that, contrary to our initial hypothesis, it is *not* indeterminate whether *a* is identical with *b*. But my response to this reductio argument is that it is clearly fallacious, for the following reason. If from the initial hypothesis—that it is indeterminate whether *a* is identical with *b*—it follows that *b* has the property of being such that it is indeterminate whether it is identical with *a,* then by parity of reasoning it follows that *a* has the symmetrical property of being such that it is indeterminate whether it is identical with *b*. But since these 'two'

properties 'differ' only by permutation of *a* and *b,* they are not determinately distinct properties, given the initial hypothesis that *a* and *b* themselves are not determinately distinct. Consequently, *b*'s possession of 'one' of those properties cannot render *b* determinately distinct from *a* because, *ex hypothesi, a* has a property which is not determinately distinct from that property of *b*. Accordingly, the reductio argument must go wrong at the point where it is inferred that *a* does *not* have the property just assigned to *b* from the fact that it is not indeterminate whether *a* is identical with *a*. (Precisely *how* the argument goes wrong at this point is a matter I shall return to in a moment.)

5. Noonan's Alternative Reductio

Even so, it might be thought that there are, in the electron(s) example, plenty of *other* properties, besides the contentious one(s) just mentioned, which could be appealed to for the purposes of a reductio of the hypothesis that it is indeterminate whether electron *a* is identical with electron *b*. This idea forms the basis of a recent attempt by Harold Noonan to overcome the problem that I have identified in Evans's argument.[111] Noonan seems to concede the force of my objection to Evans's proof, but considers that Evans's conclusion can still be secured by reasoning of a similar kind, albeit reasoning which does not appeal, as Evans's own proof does, to *identity-involving* properties. He also provides an illustrative example, based on Shoemaker's well-known Brown/Brownson case, in which Brown's brain is transplanted into Robinson's body, and the question arises as to whether Brownson—the person with Brown's brain and Robinson's body—is identical with Brown. Noonan wants to show that this case cannot coherently be treated as one in which it is ontically indeterminate whether Brown is identical with Brownson. Now, I would agree that this is not the sort of case in which talk of ontically indeterminate identity is appropriate, my reason being that there is nothing in this case which resembles a state of quantum entanglement. However, the kind of proof which Noonan has in mind as a replacement for Evans's can easily enough be reconstructed for my own quantum mechanical example, as we shall see in a moment. But first let us see how it is supposed to work in the Brown/Brownson case. We begin by assuming, for reductio, that it is indeterminate whether Brown is identical with Brownson. Let us also suppose,

[111] See Harold W. Noonan, 'E. J. Lowe on Vague Identity and Quantum Indeterminacy', *Analysis,* 55 (1995), 14–19. For an earlier response, see my 'Reply to Noonan on Vague Identity', *Analysi* s, 57 (1997), 88–91.

as seems perfectly uncontentious, that before the transplant Brown's body is fat while Robinson's body is thin. Then, given our initial assumption, it surely follows that whereas it is *not* indeterminate whether *Brownson* is thin after the transplant, it *is* indeterminate whether *Brown* is thin after the transplant. But then it follows that Brown and Brownson are after all not identical, because they differ in their properties—Brown having the property of being such that it is indeterminate whether he is thin after the transplant and Brownson not having that property.

Now, as I say, while I don't think, for independent reasons, that the Brown/Brownson example can be regarded as one involving ontically indeterminate identity, I recognize that the style of argument which Noonan has used here can easily enough be adapted for use on my own quantum-mechanical example, as follows. For example, it may be said, it is presumably *not* indeterminate whether electron *a* was captured by the helium ion at a certain time *t*1, and from this it seems to follow that *a* does *not* have the property of being such that it is indeterminate whether it was captured by the helium ion at *t*1. But, on the hypothesis that it is indeterminate whether *a* is identical with *b,* it is surely also indeterminate whether *b* was captured by the helium ion at *t*1, and from this it seems to follow that *b does* have the property of being such that it is indeterminate whether it was captured by the helium ion at *t*1. So, as before, we seem compelled to conclude that *a* and b differ in their properties and hence, by Leibniz's law, that they are numerically distinct, contrary to the hypothesis in dispute. And note that the properties appealed to here are *identity-free,* rather than *identity-involving,* so that the kind of objection that I raised against Evans's proof cannot be raised again this time, for the properties in question do not 'differ' merely by permutation of *a* and *b*.

However, my view is that this new reductio argument is quite as fallacious as the original one, as I shall now try to explain. When we attribute historical properties to entities, we have to specify *at what time* they have those properties. For example, the property of being a mother is a historical property—it is the property of having given birth to a child—and consequently a person may have this property at one time and yet not have it at another (earlier) time. Now, in the course of the reductio argument presently under consideration, it is said to follow from the argument's premisses that *b* has the property of being such that it is indeterminate whether it was captured by the helium ion at *t*1 and it is also said to follow that *a* does *not* have this property. However, although the property in question is clearly a historical one, no mention has been made of the *time* at which this property is allegedly had by *b* but not by *a*. Let us say that *t*2 is the time at which *b* is released by the helium atom following a period of 'entanglement'. Then perhaps we can concede that, at *t*2, *b* has the property

of being such that it is indeterminate whether it was captured by the helium ion at *t*1. In that case, the question we have to address is whether the reductio argument has given us any reason to suppose that, at *t*2, *a* does not have this property. I do not think it can have. For, according to the thesis of quantum entanglement, there is *no fact of the matter* as to which of the two entangled electrons in the shell of the helium atom prior to *t*2 was the one which was captured at *t*1 and which was the one already present in the shell at *t*1—and, *ex hypothesi, a* was one of those electrons, as was *b*. Consequently, there is exactly the same reason to suppose that, at *t*2, *a* has the property of being such that it is indeterminate whether it was captured by the helium ion at *t*1 as there is to suppose that, at *t*2, *b* has this property. On the other hand, if we concede that *at the time of capture, t*1, *a* does *not* have the property of being such that it is indeterminate whether it was captured by the helium ion at *t*1, then the question we have to address is whether the reductio argument has given us any reason to suppose that, at *t*1, *b does* have this property. Again, I do not think it can have. For, at *t*1, there were two *non*-entangled electrons—of which *b* was one, as was *a*—one of which was in the process of being captured by the helium ion while the other was already present in the ion's shell: and *neither* of these electrons has, at *t*1, the property of being such that it is indeterminate whether it was captured by the helium ion at *t*1. So *b* no more has that property at *t*1 than does *a*. I conclude that Noonan's attempt to prove what Evans failed to prove is just as unsuccessful.

6. The Determinacy of Self-Identity

Let us recall for a moment Evans's original reductio argument, which appealed to the claim that electron *a* does *not* possess the property of being such that it is indeterminate whether it is identical with *a*. I argued that it was mistaken to infer this from the fact that it is not indeterminate whether *a* is identical with *a*. My view is that while the statement that it is not indeterminate whether *a* is identical with *a* is always both meaningful and true (where '*a*' is a name for an existing electron), all that can legitimately be inferred from this statement is that *a* does not possess the property of being such that it is indeterminate whether it is *self-identical—not* that *a* does not possess the property of being such that it is indeterminate whether it is *identical with a,* nor that *a does* possess the property of being such that it is *not* indeterminate whether it is identical with *a*. More generally, my contention is that entities such as electrons—that is, entities which can *sometimes* but *not always* be determinately identified—always have determinate *self*-identity, even though there can be circumstances in

which two or more such entities exist in an 'entangled' state, where all talk of numerical identity or diversity between those entities ceases to have meaning. (Indeed, I am inclined to regard the possession of determinate *self*-identity as a necessary condition of entityhood and thus of anything whatever's existence, though I shall not press for this here.)

7. Quasi-Objects

If what I have said so far is correct, then electrons provide an example of a category of entities which are determinately countable but not always determinately identifiable. I propose to call such entities *quasi-objects*. (Correspondingly, we might call the general term 'electron' a *quasi-sortal* term.) It is an open question whether we ever encounter such entities in the macroscopic world, where countability is normally associated with the possession of determinate identity-conditions. It seems that quantum theory provides a special reason—in the form of the Pauli Exclusion Principle—why electrons remain countable even in states of entanglement or superposition, despite their lack of determinate identity in such states. It is this principle which requires, for instance, that the shell of a neutral helium atom can only accommodate two electrons, which must be of opposite spin. It seems unlikely that anything similar could obtain at a macroscopic level—though, of course, it is notoriously difficult to explain the quantum/macroscopic distinction or to justify the assumption that superposition is never a macroscopic phenomenon. Some philosophers of quantum theory would indeed deny that assumption, even going so far as to maintain that wave-function 'reduction' or 'collapse' never occurs. If that were really so, it seems that we should have to say that even the macroscopic world is, after all, populated (at best) by quasi-objects rather than by objects. However, that is not a speculation which I propose to take seriously here.

Notice that one implication of an admission of quasi-objects into one's ontology is that one must amend one's *set theory*. This is because standard sets are *objects,* albeit abstract ones. That is to say, it is presumed in standard set theory that sets have determinate identity-conditions, in accordance with the Axiom of Extensionality. As we stated this principle earlier, it affirms that if x and y are sets, then x is the same set as y if and only if x and y contain exactly the same members. How, then, can we properly talk of the 'set' of electrons in the shell of a certain helium atom? We know that that shell contains precisely *two* electrons, but also think that those electrons lack determinate identity. Lacking determinate identity

as they do, we cannot say that the identities of those electrons determine the identity of a particular set which contains them as its sole members. We might try to assign the labels '*a*' and '*b*' to the two electrons in the atom's shell and then define the set *S* as the set whose members are *a* and *b*. However, if a set *S* has precisely two members, *a* and *b,* then *S* has precisely two distinct singleton subsets, *a* and *b*. But in the present case we cannot say this, because we cannot identify any distinct subset of *S* which possesses one rather than the other of the electrons as its sole member. If we could, then we would be able, after all, to distinguish between the identities of those electrons, which we have just admitted to be impossible.

I agree, thus, with those quantum logicians who maintain that standard set theory is an inadequate mathematical basis for quantum theory and needs to be supplemented by a theory of 'quasi-sets', which themselves qualify (in my terms) as quasi-objects.[112] However, I do not go as far as some of these logicians do, who maintain that even the concept of *self-identity* must be abandoned as inapplicable to quantum entities and quasi-sets thereof. This is, not least, because I do not go to the extreme of holding that identity statements containing names of such entities *never* have determinate truth-value, only that this is sometimes so. Some of these logicians maintain, for example, that the principle of the identity of indiscernibles fails for quantum entities, *not* because two such entities can be indiscernible and yet not numerically identical with one another (a view held by some who think that such entities possess primitive 'thisness' or 'haecceity'), but rather because two such entities can be indiscernible and it be altogether *meaningless* to speak of their being numerically identical with *anything,* even themselves. By contrast, I am happy to allow that the principle of self-identity, '$(\forall x)(x = x)$', can take as values of its variable of quantification entities which I would classify as being 'quasi-objects'. The property of self-identity is one which, I think, is unproblematically and determinately possessed by quasi-objects such as electrons. What such quasi-objects may *not* unproblematically possess are certain identity-involving properties, such as the property of being determinately identical with *a* (where '*a*' is a name for a quasi-object, such as an electron).

[112] See e.g. Decio Krause, 'On a Quasi-Set Theory', *Notre Dame Journal of Formal Logic,* 33 (1992), 402–11, Newton C. A. da Costa and Decio Krause, 'Schrödinger Logics', *Studia Logica,* 53 (1994), 533–49, Decio Krause and Steven French, 'A Formal Framework for Quantum Non-Individuality', *Synthese,* 102 (1995), 195–214, and Steven French and Decio Krause, 'Vague Identity and Quantum Non-Individuality', *Analysis,* 55 (1995), 20–6.

8. Homogeneous Stuffs

So far I have argued that there can be entities which are determinately countable and yet which may lack determinate identity. Can the reverse also be the case? Can there be entities which possess determinate identity and yet which may lack determinate countability? I believe so. *Parts* or *portions* or *quantities* of homogeneous stuff would seem to be such entities. By a 'homogeneous stuff' I mean a space-filling material which is infinitely divisible, throughout its extension, into parts which consist of material of the same kind (some philosophers call such stuff 'atomless gunk').[113] What we *ordinarily* call 'stuffs'—such as butter, wood, and gold—are not homogeneous stuffs in the prescribed sense, because (we now believe) they are ultimately composed of atoms or molecules, which are in turn composed of protons, neutrons, and electrons. But although it may be the case that *no* homogeneous stuffs actually exist, it seems that they *could have* existed and this suffices for my purpose of using them as an example. Henceforth, then, I shall use the term 'stuff' as shorthand for 'homogeneous stuff', in the intended sense. (How far the arguments that follow apply to the non-homogeneous stuffs that actually exist is an open question, but one which I shall not pursue here.)

I should acknowledge immediately that all three of the general terms I have just used—'part', 'portion', and 'quantity' of stuff—are somewhat misleading terms for the type of entity I intend to designate by means of them, though unfortunately English does not appear to supply any more suitable general term. English does, however, provide complex expressions of the form 'some *S*'—where some' is unstressed and '*S*' is a place-holder for a *mass term,* such as 'gold'—which can be used to refer to a *particular* entity of this type (or could be so used, if the kind of stuff designated by the mass term in question were homogeneous).[114] So, imagining gold to be a homogeneous stuff, the expression 'some gold' can be used to refer to a particular entity of the type I have in mind, as in the following sentence: 'Some gold now wholly composes this ring and it (the same gold) was formerly scattered throughout this room.' This is the type of entity I would call a *part* or *portion* or *quantity* of gold. 'Part', 'portion', and 'quantity'

[113] The term 'atomless gunk' is David Lewis's: see his *Parts of Classes* (Oxford: Blackwell, 1991), 20. Some philosophers use the adjective 'homoeomerous' to mean what I mean by 'homogeneous': I prefer the latter simply because it is more familiar. On these and many related matters, see Dean W. Zimmerman's extremely interesting and informative paper, 'Theories of Masses and Problems of Constitution', *Philosophical Review,* 104 (1995), pp. 53–110.

[114] See Helen Morris Cartwright, 'Heraclitus and the Bath Water', *Philosophical Review* 74 (1965), 466–85.

are all potentially misleading in this context in that they are, grammatically, *count* nouns, whereas I shall be arguing that entities of this type lack determinate countability. 'Quantity' is additionally misleading, however, because I want to say that entities of this type do have determinate *identity*—as the example sentence cited earlier indicates—and yet when we talk about the same *quantity* of gold, we customarily mean to talk about sameness of *amount* of gold rather than about the numerical identity of particulars of the type I have in mind. Thus, as it would normally be interpreted, the following sentence is by no means equivalent to the sentence cited earlier: 'A quantity of gold now wholly composes this ring and *the same quantity of gold* was formerly scattered throughout this room.' Consequently, I shall use the term 'part (of stuff)'—or, alternatively, 'portion (of stuff)'—in preference to the term 'quantity (of stuff)'.[115]

At this point we need to distinguish between what I have been calling a *part* of stuff and what we may call a *piece* of stuff. A 'piece' of stuff may be defined as being a *maximal connected part of stuff*: that is to say, a piece of stuff is a part of stuff which is (1) *connected,* in the sense that every part of it is spatially connected to every other part of it by a series of spatially contiguous parts, and (2) *maximal,* in the sense that it is not a proper part of any larger connected part of stuff of the same kind. For example, a single, detached, lump of gold would qualify as a piece of stuff in this sense, if it weren't for the fact that gold is ultimately composed of gold atoms. (If a term is wanted for a part of stuff which satisfies condition (1) above but which may not satisfy condition (2)—that is, which is connected but which may be part of a larger connected part—then I suggest the term 'parcel'; we shall need to draw on this distinction later.) Now, *pieces* of stuff are *individual objects,* in my sense: they not only have determinate identity-conditions but are also determinately countable. Their identity-conditions are, in fact, just the same as those of parts of stuff (which, of course, they are). One quite plausible identity-criterion for parts of stuff is just this: if x and y are parts of stuff of kind K, then x is the same part of stuff as y if and only if x and y fill exactly the same part of space. This criterion of identity appeals to the principle that a part of stuff excludes any other part of stuff—or, at least, any other part of stuff of the same kind—from the part of space which it occupies. Although this exclusion principle (which is quite unlike the Pauli Exclusion Principle, be it noted) is not altogether indisputable—it may be objected, for instance, that the principle fails to specify the *diachronic* identity-conditions of parts of stuff

[115] Cf. Zimmerman, 'Theories of Masses and Problems of Constitution'. Zimmerman's preferred term is 'mass': see pp. 57–8.

(their *persistence*-conditions)[116]—I shall accept it for present purposes. *Pieces* of stuff are, moreover, determinately countable, because every such piece is, by definition, spatially separate from any other such piece. Thus, if a room contained some lumps of gold (imagining, for present purposes, that gold is a homogeneous stuff), there would be a determinate fact of the matter as to *how many* lumps of gold it contained. By contrast, however, *parts* of stuff are not determinately countable, because every such part is infinitely divisible into smaller parts of the same kind of stuff. Thus, if a room contained some gold, the question 'How many parts of gold does this room contain?' could not be answered.

9. Identity Without Determinate Countability

The unanswerability of a question like this is not simply a reflection of ignorance on our part: it is not that we just do not *know* how many parts of gold there may be in a certain room, but that it makes no sense even to inquire how many there are. Where parts or quantities of stuff are concerned, we can meaningfully ask only 'How *much*?', not 'How *many*?'. Here it may be responded that the uncountability of parts of stuff is just the same as the uncountability of the real numbers, so that there always *is* an answer, albeit an uninteresting one, to the question 'How many?' in the case of such parts—namely, 'An uncountable infinity of them.' However, I don't think that this response goes to the heart of the issue. What we lack in the case of the concept of a mere part of gold is any principle of *individuation* for the items falling under the concept. This is not to say that parts of gold *cannot ever* be individuated, but only that they are never individuable merely *as* parts of gold. I can individuate a part of gold as, for example, that part of gold which is the sum total of the gold currently composing a certain gold ring—but that is because I can independently individuate the gold ring as an object in its own right. A 'principle of individuation', as I understand that term, is a principle which tells us what is to count as *one* instance of a given kind. Different kinds very often convey different principles of individuation for their instances. Such principles must, however, be carefully distinguished from what I have been calling *criteria of identity*. What I am contending, indeed, is that the concept of a part of stuff (quite possibly) *does* convey a criterion of identity for its exemplars, but *not* a principle of individuation. Parts of stuff are at

[116] It is debatable whether an informative diachronic identity-criterion for parts of stuff is, even in principle, available: for discussion, see Zimmerman, 'Theories of Masses and Problems of Constitution', 82–5.

best individuable only derivatively, via the principles of individuation governing instances of other kinds, such as the individual objects which such parts of stuff compose. (Note, incidentally, that although we *can* give a principled answer to a more restricted question such as 'How many (non-overlapping) parts of gold *of such-and-such a volume* are there in this room?', the answer to such a question—as it might be, 'Ten'—is not arrived at by enumeration of ten individual parts of gold in the room, but only conveys the fact that the total quantity of gold in the room occupies ten times the designated volume.)

Here the following question might be raised. On the assumption that the identity-criterion for parts of stuff proposed earlier is correct—namely, that if *x* and *y* are parts of stuff of kind *K,* then *x* is the same part of stuff as *y* if and only if *x* and *y* fill exactly the same part of space—why shouldn't we say that parts of stuff are individuated by the parts of space which they occupy? After all, doesn't that criterion imply that only *one* part of stuff of kind *K* can exactly fill a given part of space? But the problem with this suggestion is that parts of space themselves, like parts of stuff, very arguably lack a principle of individuation. It won't do, here, to claim that parts of space can be identified with sets or aggregates of points and be individuated as such: for either points are just parts of space themselves—in which case the claim in question carries us no further forward—or else (as I prefer to think) points are *limits* of parts of space, in which case parts of space cannot be aggregates of them.[117] It seems that parts of space, like parts of stuff, can only be individuated derivatively (thus, one could individuate a certain part of space as the part of space which is currently wholly occupied by a certain gold ring). Incidentally, if one were to query the identity criterion for parts of stuff which has just been proposed—perhaps on the grounds that it is at least conceivable that different parts of stuff could interpenetrate each other—then I think that the best one could offer by way of an identity criterion for parts of stuff would be this: if *x* and *y* are parts of stuff of kind *K,* then *x* is the same part of stuff as *y* if and only if *x* and *y* consist of exactly the same parts. The trouble with this, of course, is that the parts of a part of stuff of kind *K* are themselves just parts of stuff of kind *K,* so that the proposed criterion, while it surely states a truth, is uninformative because circular. However, it is worth pointing out that even if we were to conclude that there is *no* informative criterion of identity for parts of stuff, this need not undermine the intuition—which I think is a strong one—that parts of stuff do have determinate identity.

[117] See Joshua Hoffman and Gary Rosenkrantz, *Substance Among Other Categories* (Cambridge: Cambridge University Press, 1994), 107 ff., 188 ff.

10. Quasi-Individuals

Another way to put the point about individuation made above is to say that parts of stuff have no *unity* merely in so far as they are parts of stuff, one consequence of this being that we cannot make direct reference to a part of stuff using a demonstrative noun phrase of the form 'that part of *S*', where '*S*' is a mass term denoting the kind of stuff in question. If I point in the direction of some gold and say 'That part of gold weighs one ounce', for example, then I have failed to express a determinate proposition, because I have failed to pick out a determinate object of reference by means of the demonstrative noun phrase 'that part of gold'. By contrast, if I say 'That *piece* of gold weighs one ounce', or 'That gold *ring* weighs one ounce', then I have indeed said something with determinate meaning that is either true or false. The problem, once again, is that whenever I point in the direction of some gold, there is never *just one* part of gold that I could be taken to be demonstrating because, as we have seen, any part of gold is always infinitely divisible into other parts of gold (once again adopting the fiction that gold is a homogeneous stuff). Nothing whatever *counts* as 'just one' part of gold, *simpliciter,* in the way that something counts as just one gold ring, or just one book, or just one tiger. Gold rings, books, and tigers are naturally *unified* entities, their unity arising from the principles governing the way in which their parts are organized or arranged to make a whole of the appropriate kind. Thus a gold ring must consist of parts of gold suitably fused together and suitably shaped into a toroidal form and a book must consist of rectangular sheets of paper bound together along one edge into sheaf. But parts of gold must merely consist of lesser parts of gold, without any further restriction—not even one of spatial connectedness. A part of gold may be scattered about a wide area or collected together into a single lump: it requires no specific *form* to be a part of gold. Lacking necessary form, it lacks natural unity and hence lacks genuine individuality. Accordingly, I propose to call entities like this—that is, entities which possess determinate identity-conditions but not determinate countability—*quasi-individuals*.

11. Matter and Form

We have seen that quasi-objects and quasi-individuals differ from ordinary individual objects in diametrically different ways: the former having determinate countability but not determinate identity and the latter having determinate identity but not determinate countability. As exemplars of these categories of entities I have proposed electrons and parts of

homogeneous stuff, respectively. Both electrons and parts of stuff are concrete entities, that is, entities which exist in space and time (by contrast with abstract entities such as numbers and sets).[118] Some interesting thoughts are suggested by the examples we have looked at so far. One is that only in the case of *concrete* entities can determinate identity and determinate countability come apart in the ways we have observed.[119] Another is that the reason why they can come apart in these ways in the case of concrete entities has to do with the distinction, applicable only to such entities, between *matter* and *form* (a distinction which I shall discuss in much more depth in Chapter 9). We might venture to say that, whereas ordinary individual concrete objects have both matter and form, parts of stuff (as we have been thinking of them) are matter without form, whereas electrons (and other so-called fundamental particles) are form without matter. It is the formlessness of parts of matter which deprives them of individuality and makes them uncountable as such. And, perhaps, it is the matterlessness of electrons which permits them to exist in states of superposition, preventing them (when in such states) from retaining distinctness from one another by virtue of difference in their space-time location. (Electrons do, of course, possess *mass,* but that is not to be confused with *matter* in our sense: electrons are not composed of anything, least of all *stuff* of any kind.) This thought provokes the further thought that there might, after all, be concrete entities of another kind which, being 'matterless', might qualify as quasi-objects, alongside electrons and other such fundamental particles—namely, *persons,* at least as conceived on dualist principles as not being identifiable with material bodies. Against this, however, we must set the strong intuition that some of us have that persons, unlike electrons, do possess primitive 'thisness' or haecceity, the implication of which is that there cannot ever fail to be a 'fact of the matter' as to the identity or diversity of persons.[120]

[118] On the abstract/concrete distinction, see my 'The Metaphysics of Abstract Objects', as well as Chapters 2 and 10 of the present book.

[119] But see Robert Brandom, 'The Significance of Complex Numbers for Frege's Philosophy of Mathematics', *Proceedings of the Aristotelian Society,* 96 (1996), 293–315, where it is argued that certain *mathematical* entities are countable even though they are not uniquely identifiable (owing to symmetry considerations). And, of course, I myself have just argued that there may be *quasi* -sets, which would be abstract quasi-objects: though my arguments for them are consistent with the possibility that all quasi-sets have *concrete* quasi-objects in their transitive closure and thus, in a sense, inherit their quasi-objecthood from that of concrete quasi-objects.

[120] See Richard Swinburne, 'Thisness', *Australasian Journal of Philosophy,* 73 (1995), 389–400.

12. Modes and Universals

Moving on from these speculations, the last major question that I want to address in this chapter is whether the categories of *individual object, quasi-object,* and *quasi-individual* together exhaust the field of ontology, or whether we need to acknowledge a fourth category of entity whose members possess neither determinate identity nor determinate countability. I believe we do, and propose that we denominate such entities *non-objects*. As an example of non-objects I would cite *modes*—the items that other philosophers have variously called 'tropes', 'property instances', 'particular qualities', or 'individual accidents'.[121] A mode is *a particular way something is*. For instance, a solid material object, such as a rubber ball, will be *shaped* in a particular way and *coloured* in a particular way at any given time. Its being shaped in that way—say, spherically, with such-and-such a radius of curvature—is a *mode* of the ball, and its being coloured in that way—say, redly, with such-and-such a hue—is likewise a *mode* of the ball. These modes of the ball are not the same: I accept that their non-identity is a fully determinate matter of fact. Even so, reflection on the subject indicates that modes do *not* possess fully determinate identity-conditions and are not determinately countable. The temptation to suppose otherwise soon leads to absurd consequences, as we shall shortly see. But first let us be clear as to how modes differ from *universals*. Modes of concrete entities are themselves concrete entities, existing in space and time. Thus, the ball's sphericity and its redness are spatiotemporally located entities, existing where and when the ball does. Now, it is true that some philosophers hold that *universals* exist in space and time, being 'wholly present' where and when the entities exemplifying them exist.[122] However, it seems plausible to claim that when the ball changes in shape or colour, *something* ceases to exist—and this could not be the *universal* sphericity (of such-and-such a radius) or redness (of such-and-such a hue), at least so long as *other* things exemplify those universals. What ceases to exist could only be the ball's *particular* sphericity or redness. So modes are not only concrete entities, they are concrete *particulars*. And, indeed, I would want to *explain* the ball's exemplification of the universals sphericity and redness in terms of the ball's possessing modes which are particular instances of those universals. The ball itself does not instantiate those universals, but it 'exemplifies' them in virtue of possessing modes which *do* instantiate those universals (a point which I shall expand upon in later chapters). So,

[121] See e.g. Keith Campbell, *Abstract Particulars* (Oxford: Blackwell, 1990).

[122] For discussion, see David Armstrong, *Universals: An Opinionated Introduction* (Boulder, Colo.: Westview Press, 1989), 98–9.

whether or not one wants to say that universals themselves exist in space and time (have spatiotemporal location)—and I, for one, do not—it seems very plausible to say that there are *particular* qualities, or modes, which do exist in space and time and are consequently concrete entities. Anyway, that this is so is something that I shall assume from now on. (I should emphasize, incidentally, that for present purposes I do not use the term 'particular' as a synonym for the term 'individual', but rather in contrast with the term 'universal': particulars are *instances* of universals but do not themselves have instances.)

13. A Puzzle About Coinciding Modes

Consider once again the example of a particular rubber ball's sphericity. It might be thought to be wholly unproblematical that we can determinately identify something as being *this particular sphericity,* something which qualifies as a determinately distinct mode of precisely this ball. One question which we could ask here, though, is whether, this being so, numerically distinct sphericities can exist in the same place at the same time. That question could arise for the following sort of reason. The ball is wholly composed by a certain piece of rubber and yet very arguably we cannot *identify* the ball with that piece of rubber, because they differ in their modal properties and very probably in their histories. For instance, the piece of rubber could be reformed into a ring and yet continue to exist, whereas the ball would cease to exist in these circumstances. Again, the piece of rubber pre-existed the ball, if it was synthesized before being shaped into a sphere. But so long as the piece of rubber composes the ball and the latter is spherical, *both* of them are spherical—they are shaped in exactly the same way. Does this mean, however, that they possess *one and the same* sphericity—that they share a mode—or does it mean that they possess numerically distinct but qualitatively indistinguishable and exactly coinciding sphericities? Neither answer seems altogether easy to accept and neither seems defensible in a principled and non-arbitrary way.

If we say that two numerically distinct modes *can* exactly coincide, what is to prevent us from saying that *any number* of distinct modes could, in principle, exactly coincide? After all, why should the ball and the piece of rubber be restricted to having just *one* sphericity each, once we have admitted that numerically distinct sphericities can coincide? (Nor are coinciding modes to be compared with superposed electrons in a helium atom, being countable but not determinately distinct: for nothing akin to the Pauli Exclusion Principle can be invoked to justify such a description in the case of coinciding modes.) Moreover, even if the ball and the piece

of rubber each have only one sphericity, what determines which of these sphericities belongs to the ball and which to the piece of rubber? After all, the sphericities in question are intrinsically indistinguishable.

Suppose, on the other hand, that we say that two numerically distinct modes *cannot* exactly coincide and consequently that the ball and the piece of rubber share one and the same sphericity (though nothing would seem to support this judgement in the way that the identity-criterion for parts of stuff underwrites the judgement that distinct parts of stuff cannot exactly coincide). Then we should have to say, paradoxically as it seems, that the piece of rubber's sphericity could survive the ceasing-to-be of that piece of rubber: for if an interior part of the rubber composing the ball were to be destroyed, without affecting the spherical shape of the ball, then that original piece of rubber would no longer exist, even though, presumably, the ball would not acquire a new sphericity in the process.

Now it may be that this example is not liked for one reason or another. For instance, it will not be liked by those philosophers who would simply deny that a ball and the piece of rubber composing it are numerically distinct objects existing in the same place at the same time.[123] I shall discuss that and related issues more fully in Chapter 9, but for present purposes it may be helpful to modify the example somewhat so as to bypass the contested point. At the same time, I shall try to bring into sharper focus the problem which the question about coinciding modes creates.

Let *S* be a solid sphere of matter, such as the piece of rubber which we have been talking about hitherto. Then, if we acknowledge the existence of modes at all, we must surely acknowledge the existence of the following mode: *S*'s sphericity. And let *S** be the spherical parcel of matter constituting *S*'s outer shell to a certain depth *d* from *S*'s surface (remembering, here, our earlier distinction between 'pieces' and 'parcels' of stuff, this being that while both pieces and parcels are *connected,* pieces are distinctive in being *maximal*). Then, likewise, if we acknowledge the existence of modes at all, we must surely also acknowledge the existence of the following mode: *S**'s sphericity. Clearly, *S* and *S** are numerically distinct objects (they do not even occupy the same place at the same time, although they do overlap). Moreover, *S* can exist without *S**, and *S** can exist without *S*. The proof of this last claim is as follows. If *S*'s inner core up to a distance *d* from its surface is removed or destroyed, then *S* ceases

[123] See, for example, Michael B. Burke, 'Preserving the Principle of One Object to a Place: A Novel Account of the Relations Among Objects, Sorts, Sortals, and Persistence Conditions', *Philosophy and Phenomenological Research,* 54 (1994), 591–624. I discuss Burke's position in my 'Coinciding Objects: In Defence of the "Standard Account"', *Analysis,* 55 (1995), 171–8.

to exist, but *S** continues to exist; on the other hand, if some matter is exchanged between *S** and *S*'s inner core, then *S** ceases to exist (since a parcel of matter ceases to exist when any of the matter composing it is removed or replaced), but *S* continues to exist.

Now I ask: is *S*'s sphericity identical with *S**'s sphericity? In favour of a positive answer is the fact that these sphericities are empirically indistinguishable, occupying exactly the same region of space at the same time. In favour of a negative answer, however, is the fact that *S*'s sphericity belongs to *S* while *S**'s sphericity belongs to *S**. Modes are *existentially dependent* entities, depending for their existence upon the objects which 'possess' them (a notion which I shall explore more fully in Chapter 6). Thus, if *S* ceases to exist, then *S*'s sphericity should cease to exist too; whereas if *S* continues to exist and does not change in shape, then *S*'s sphericity should likewise continue to exist. The same applies to *S** and its sphericity. However, if we were to say that *S*'s sphericity is *identical* with *S**'s sphericity, then we should have to deny that the foregoing existential dependencies obtain. For these dependencies imply that if, say, *S* ceases to exist while *S** continues to exist and does not change in shape, then *S*'s sphericity ceases to exist while *S**'s sphericity continues to exist—and this is plainly incompatible with the thesis that these modes are identical.

So the identity thesis is incompatible with the view that modes are existentially dependent entities in the sense explained. But the latter view is very hard to abandon. If modes do not depend for their existence upon the objects which possess them, why should they not 'float free' of such objects altogether? And yet the thought that they might do so is seemingly absurd. Moreover, if modes *were* to have determinate identities, it seems that these would in fact have to depend upon the identities of the objects possessing them: how else could we identify a particular sphericity other than as the sphericity of such-and-such an identifiable object? Perhaps, then, one should prefer to say that *S*'s sphericity and *S**'s sphericity are *numerically distinct* modes, despite the fact that these modes are not empirically distinguishable. But this position is quite as hard to defend as the view that the modes in question are identical. For once we admit that there are *two* distinct but empirically indistinguishable sphericity modes occupying exactly the same region of space at the same time, it is clear that we must admit *infinitely* many such modes. This is because, in addition to *S**, there are infinitely many (indeed, continuum many) *other* spherically shaped shells of matter located within *S,* each with a different depth *d*; and each of these will, by parity of reasoning, have to be assigned its own distinct sphericity mode—for all of these shells, like *S**, are distinct and existentially independent objects. I take it, however, that such an uncountable infinity of empirically indistinguishable sphericity modes would be

regarded as an embarrassment of riches even by the most extravagant ontologist.

We see, then, that it is difficult to defend *either* the view that all of these sphericity modes are identical *or* the view that all of them are numerically distinct. The lesson, I suggest, is that we should not think of entities such as modes as possessing determinate identities at all. They are not themselves 'objects', somehow related to the objects which 'possess' them. Rather, they have an 'adjectival' status: they are, quite simply, particular *ways those objects are.*

This conclusion can be reinforced by other examples. Here, for instance, is another conundrum that we might pose concerning the sphericity of the rubber ball discussed earlier. What happens if the ball is temporarily squashed out of shape but subsequently returns to being spherical again? Does it acquire a new sphericity, numerically distinct but qualitatively indistinguishable from its previous sphericity, or does its original sphericity come back into existence after a period of non-existence? How many sphericities would the ball possess in the course of a vigorous game of tennis? What begins to emerge from these and our preceding reflections is a suspicion that it really doesn't matter how we answer these questions about the identities of sphericities and how to count them, because there are no real *facts of the matter* which determine what the 'right' answers to such questions are. We can, I think, include sphericities and other modes in our ontology without needing to address or even to countenance most such questions. Only a prejudice in favour of the Quinean dictum 'No entity without identity' could tempt us to suppose otherwise. We can say, for instance, that the ball has a sphericity and that the piece of rubber composing it has a sphericity and simply refuse to admit as legitimate any question as to the identity or diversity of these items—even if we also decide to say that the ball and the piece of rubber composing it are definitely *not* identical with one another. Sometimes, it seems, the only questions of identity and diversity which we can sensibly address in the case of modes are questions of *qualitative,* not *numerical,* identity and diversity. We can always sensibly ask, thus, whether two numerically distinct objects have exactly similar sphericities: but, having answered this question positively, there may simply be no further question of substance to be raised as to whether or not the sphericities of these objects are themselves *numerically* distinct. The principle of the identity of indiscernibles can indeed seem to fail in such a case for want of significance. (Of course, modes which are *not* indiscernible—such as a ball's sphericity and that same ball's redness, or the sphericity of one ball and the sphericity of another ball—must for that very reason *not* be numerically identical; what I am suggesting is that in the case of modes which *are*

indiscernible—such as a ball's sphericity and the sphericity of the piece of rubber composing the ball—there is no fact of the matter as to their numerical identity or distinctness.)

14. Concluding Remarks

It seems, then, that all four categories of entity which we have contemplated should be admitted as genuine categories, at least in the sense of being categories of entities which could intelligibly be supposed to be exemplified, whether or not exemplars of all of them do in fact exist. It is perhaps significant that all of the putative examples of quasi-objects, quasi-individuals, and non-objects which we have examined are in some measure contentious as regards the question of their actual existence. But then, there are doubts that can be raised, too, about the actual existence of what I have called 'individual objects'. Perhaps—as I suggested in Chapter 1—the most useful service which analytic metaphysics can perform in this area is simply to chart the possibilities of existence and thereby provide us with the conceptual tools wherewith to categorize the world's contents as best we can in the light of experience, while we try to keep open minds as to how we might interpret new empirical evidence in the future. Of course we must to some extent look to scientific theory and experiment to tell us 'what there is': but scientists can only tell us what they think there is in terms which presuppose some categorization of the entities in question—and the task of category-construction is ultimately one for metaphysics, not for empirical science. The modest hope of analytic metaphysics is that it may ease the task of constructing empirical theories by providing a suitable categorial framework for characterizing the entities posited by such theories. An inadequate metaphysics—for instance, one which dogmatically presumes that the only possible entities are individual objects—can certainly hinder the process of scientific theory-construction and arguably has actually done so in the case of modern quantum theory. Since every theorist unavoidably approaches the task of theory-construction under the guidance of *some* metaphysical assumptions, it is better that these assumptions be the product of rational reflection than that they be unspoken and unexamined ones.

4 Time and Persistence

The previous three chapters were concerned with very broad issues in metaphysics: the first with the status of metaphysics as a discipline and the second and third with an examination of some of the most fundamental notions of metaphysics—the notion of an *object* and the related notions of *identity* and *unity*. These notions are applicable in every area of ontology, whether one is concerned with the ontology of mathematics, of minds, of music, or of mechanics. However, we saw in Chapter 2 that a division may be discerned—perhaps the most important division in all ontology—between *abstract* and *concrete* objects (even though it is still hotly debated precisely how this division should be drawn). Most metaphysicians, myself included, implicitly assume—even if they happily countenance the existence of abstract objects—that the realm of the concrete has some sort of ontological priority over that of the abstract. (Naturally, there have been exceptions to this rule in the history of philosophy, Pythagoras and Plato providing the best-known examples.) Justifying such an assumption is no easy matter, and I shall not attempt it for the present (though I shall return to the issue in Chapters 10 and 12). However, what seems clear—if the verdict of Chapter 2 is accepted—is that the notion of a concrete object is intimately connected to the notion of *time*. The realm of the concrete precisely *is* the realm of time-bound existence. Clearly, then, if we are adequately to grasp the concept of concrete existence, we need to understand the nature of time itself—perhaps the most puzzling and seemingly paradoxical feature of the world. Concerns about the seemingly paradoxical character of time are, unsurprisingly, at the root of many traditional attempts to deny its reality, having as their consequence the promotion of Platonistic or Pythagorean systems of metaphysics which attribute ontological priority to abstract entities. In the present chapter, I shall attempt to vindicate the concept of time in a way which does not do violence to our everyday experience of temporality—for it is my belief that those philosophers who represent themselves as friends of time and yet, for mistaken reasons, distort it into something unrecognizable in experience, are in fact some of its most dangerous enemies.

Amongst the issues that currently divide philosophers of time, two are

particularly prominent and, moreover, seem to be interrelated in some way. One is the question of whether a *tensed* or a *tenseless* characterization of time is ontologically more fundamental. The other is the question of whether objects persist through time by *enduring* or by *perduring* (a question which hinges on whether persisting objects can be said to possess *temporal parts*). It is widely assumed—often without much argument—that the tensed view of time goes naturally with an endurance account of persistence while the tenseless view goes naturally with a perdurance account. Although some eminent philosophers of time do not share this assumption,[124] one of my main aims in this chapter will be to show that, when the terms in which it is framed are properly understood, the assumption is indeed correct. Just as importantly, I shall also be concerned to present and defend a particular version of the tensed view, distinguishing it from certain alternative versions which I find to be problematic. Before commencing these tasks, however, I have some more general observations to make on the metaphysics of time and how I think that topic is best approached.

1. Space, Motion, and the Metaphysics of Time

The distinction between 'tensed' and 'tenseless' views of time is sometimes assumed to coincide with that between so-called *dynamic* and *static* views of time. Some philosophers may indeed understand these distinctions to be the same, but others clearly do not. The 'dynamic' versus 'static' distinction has the disadvantage that it evidently depends upon a metaphorical use of these expressions. Similar remarks may be made about the use of statements such as 'Time flows' or 'The present moment is ever-changing' to characterize the so-called dynamic view of time, or about the use of expressions like 'the block universe' to describe the world as conceived according to the so-called 'static' view. The problem with such metaphors is that they are grounded in notions of *movement* and *rest* (or, more generally, of *change* and *unchange*)—and movement and rest (or change and unchange), understood literally, always take place in time, and so cannot literally be attributed to time itself or to moments of time. (To

[124] See, for instance, D. H. Mellor, *Real Time* (Cambridge: Cambridge University Press, 1981), ch. 8, where Mellor rejects the idea that persisting objects have temporal parts despite his allegiance to a tenseless theory of time. Contrariwise, Storrs McCall attempts to combine a tensed view of time with an acceptance of temporal parts: see his *A Model of the Universe* (Oxford: Clarendon Press, 1994), chs. 2 and 7. The latter is likewise the position of Michael Tooley: see his *Time, Tense, and Causation* (Oxford: Clarendon Press, 1997).

say, as some authors do—for example, C. D. Broad and Storrs McCall[125]—that we can legitimately use the language of change to characterize temporality provided we distinguish between change *in* time and change *of* time is, I think, unhelpful, because there can be literally nothing in common between the two sorts of 'change': so why use the same word for both?) I shall try as far as possible to avoid contentious metaphors and similes in what follows and endeavour to characterize the tensed/tenseless distinction without their aid.

Before attempting such a characterization, however, I want to declare my support for a quite different claim about the connection between our understanding of time and the notion of movement or change—a claim which I think is attributable to Aristotle.[126] There is involved in this claim no misleading appeal to a *metaphorical* use of words like 'move' or 'change' to describe time itself. Rather, the claim is that the notion of movement or change is *conceptually prior* to that of time. For those of us who are familiar with the symbolic notation of mechanics, this may come as a surprise, since we are often led to believe that this notation implies that motion just *is* alteration of position over time: $v = s/t$ or, more accurately, $v = \mathrm{d}s/\mathrm{d}t$. The suggestion here is that the notions of spatial extension or distance (s) and temporal duration (t) are prior to that of motion or velocity (v). But, of course, any equation may be read in either direction and does not of itself imply conceptual priority for either of its limbs. We could just as well rewrite '$v = s/t$' as '$t = s/v$', and see this as telling us that time 'just *is*'—as Aristotle held—*the measure of motion* (or, more generally, of change).[127] After all, a 'long' time is one which a *slow*-moving body takes to cover a standard distance and a 'short' time is correspondingly one which a *fast*-moving body takes to cover that same distance; and facts such as these surely help to constitute our understanding of what temporal duration is. (These conceptual connections provide, after all, the basis of our *measurement* of time by means of mechanical clocks and even, more primitively, by observing the passage of the sun across the sky.)

What recommends this 'Aristotelian' view is that—so it appears—spatial distance and motion are both directly perceptible phenomena, whereas temporal duration as such is not. (Interestingly enough, current findings in human neuropsychology confirm that motion is perceived visually relatively independently of the visual perception of shape and position: brain-lesioned subjects can lose their capacity for motion perception

[125] See C. D. Broad, *Scientific Thought* (London: Routledge & Kegan Paul, 1923), 64 ff., and Storrs McCall, *A Model of the Universe,* 30–1.

[126] See Aristotle, *Physics,* Bk. IV, 10–14, in *The Works of Aristotle,* ed. W. D. Ross, vol. ii (Oxford: Clarendon Press, 1930).

[127] Ibid. Bk. IV, 12.

while retaining that for shape and position, and vice versa.[128] We may conclude that in human visual perception, at least, motion is *not* detected by our brains somehow integrating, with the aid of short-term memory, temporally successive perceptions of shape or position.) Indeed, it would seem to be this circumstance—that space and motion, but not time, are directly perceived—which explains, at least psychologically, why it is that we are so tempted to describe time in terms of *metaphors or similes* drawn from our perception of space and motion—that is, why some philosophers talk of time as 'flowing', while others think of it as a 'fourth dimension' akin to the three of space, and represent it by a line. (Later we shall see, though, that the latter parallel has some basis in fact if the tenseless theory of time is correct.)

However, even if it should be agreed that the notion of movement (or, more generally, of change) is indeed in some sense *conceptually* prior to that of time, this would apparently still leave open the possibility that time is *ontologically* prior to motion. Consequently, I do not want to lay too much metaphysical weight upon the 'Aristotelian' claim that I have just been defending. On the other hand, seeing the notion of time as being conceptually dependent upon that of motion can perhaps help to free us from certain perplexing and potentially misleading pictures. For instance, if one raises—as philosophers of time are regrettably apt to do—the question of how the world might appear to the mind of God, one might have the perplexing thought that, because God's mind is unchanging and yet supposedly grasps everything, the whole history of the universe must be present to his mind as a single unchanging scene, as it were 'spread out' in time. On this view, God sees the universe as a 'four-dimensional' continuum, of which we can only perceive successive three-dimensional 'cross-sections'. But then it may appear to follow that movement as we experience it is just an illusion (since God would supposedly not apprehend it)—rather in the way in which the 'movement' of animated characters in a cartoon film is said to be an 'illusion', since instead of there being any thing that literally moves in the film what happens is that different images succeed one another on the screen in slightly different positions.

Such a conclusion is perplexing because movement, being directly perceptible, *seems* so real to us (recall my earlier remarks about the neuropsychology of motion perception). But perhaps the most helpful thing to say at this point is that, to the extent that we can understand at all how the world would appear to the mind of God, there is no reason whatever to suppose that it would appear to him in the way just described—that is,

[128] See e.g. Glyn W. Humphreys and Vicki Bruce, *Visual Cognition* (Hove: Lawrence Erlbaum Associates, 1989), 109–10.

'spread out', as it were, in four dimensions. Why shouldn't he, rather, perceive the *movements* and *changes* of things—directly, as we do—but perceive them all in a single act of consciousness, embracing all of those motions from beginning to end (even the rotations of the galaxies, and so forth)? We, by contrast, can only embrace relatively short-lasting motions within a single act of perceptual consciousness, such as the roll of a ball across a table or the turn of someone's head. (In other words, the suggestion is that God's 'specious present' might be vastly longer than ours.) Now, I should emphasize that I do not think that indulging in any of these speculations about the mind of God is, ultimately, a very profitable way to try to approach the metaphysics of time. My only point is that when someone is in the grip of a certain picture of how the world must appear from a 'God's eye view'—and as a result feels inclined to make certain ontological claims, such as that motion is not 'real'—we can sometimes usefully loosen the grip of that picture by proposing an alternative and equally or even more gripping picture. But our ultimate objective should be to try to free ourselves of all such pictures, if we mean to do serious metaphysics.

2. Tensed and Tenseless Theories of Time

Abandoning, now, the false comforts of metaphor, I need to explain in literal language how I propose to distinguish between the tensed and tenseless views of time. To a first approximation, then, I shall take it that the tensed view regards the notions of *past, present,* and *future* as being indispensable ingredients in our understanding of what time is, whereas the tenseless view holds that the metaphysics of time requires only the deployment of the notions of *earlier* and *later,* together with notions definable with their aid—such as that of *simultaneity,* defined, perhaps, as holding between events which are neither earlier nor later than one another (setting aside, here, any difficulties posed by the special theory of relativity). In other words, then, the tensed view takes McTaggart's 'A-series' terminology to be indispensable for the metaphysics—not just the epistemology and semantics—of time, whereas the tenseless view takes 'B-series' terminology alone to be indispensable for the metaphysics of time. Now, having said this, certain possible confusions and false assumptions still need to be dispelled. Some of the most important of these concern the semantics of tensed sentences, to which I shall shortly turn. But first let me say that by a *tensed sentence* I mean a sentence containing a tensed verb or some equivalent linguistic expression. For instance, 'It was raining here yesterday', 'It is raining here now', and 'It will rain in

Durham on 12 March 2099' are all tensed sentences. (None of these sentences, it will be noticed, explicitly employs any of the terms 'past', 'present', and 'future', but each implicitly involves these notions in as much as each contains a verb in the past, present, or future tense.) An example of a *tenseless sentence* would be 'Two plus five is seven' or 'Discretion is the better part of valour'.

However, it has to be said at once that there are certain sentences whose status as tensed or untensed is controversial. Thus, an adherent of the tenseless view of time would doubtless say that a sentence such as 'There is rain in Durham on 12 March 2099' is a *tenseless* sentence, akin to 'Two plus five is seven'. By contrast, I would contend that 'There is rain in Durham on 12 March 2099' can *only* be understood as a tensed sentence: either it is equivalent to the (false) sentence 'There is now rain in Durham on 12 March 2099' (false because it is not now 12 March 2099), or it is an ungrammatical way of attempting to say 'There will be rain in Durham on 12 March 2099', or, finally, it is an abbreviated way of saying 'There was, is now, or will be rain in Durham on 12 March 2099' (an interpretation which I shall explain more fully anon). I don't believe that properties can be tenselessly predicated of concrete historical events, but only of abstract entities which do not exist in time (or space) at all. What it *is* to exist in time is to be a potential subject of tensed predications, in my view. That is, for a thing to exist in time is for some property to *be now* exemplified by that thing, or to *have been* exemplified by it, or to *be going to be* exemplified by it. (Of course, I can happily allow that the 'is' in the phrase 'for a thing to exist in time *is* for some property to be [etc.]' is a *tenseless* 'is', because what is being spoken of is something abstract, namely, the property or condition of *being something that exists in time*.) However, this thesis of mine is obviously controversial, so I cannot lay it down as law in advance of adjudicating between the tensed and tenseless views of time.

I turn next, then, to the semantics of tensed sentences. It is sometimes thought that a defender of the tensed view of time must deny that tensed sentences can be supplied with so-called token-reflexive truth-conditions, but I do not accept this.[129] Take the present-tensed sentence-type 'It is now raining in Durham'. I am happy to allow that the truth-conditions of (tokens of) such a sentence may be stated as follows:

(1) A token, *u,* of the sentence-type 'It is now raining in Durham' [is] true if and only if *u* [is] uttered at a time *t* such that it [is] raining in Durham at *t*

[129] The issue is touched upon in Mellor, *Real Time,* 101.

—or, alternatively but equivalently:

(2) A token, *u,* of the sentence-type 'It is now raining in Durham' [is] true if and only if *u* [is] uttered simultaneously with an occurrence of rain in Durham.

In stating these truth-conditions, I have placed square brackets around various occurrences of the verb 'is', for the following reason. On my view, although a sentence-*type* is an abstract entity which can therefore be the subject of tenseless predications, sentence-*tokens* are concrete entities existing in time, and hence cannot be the subjects of such predications. Accordingly, when I say that a sentence-token, *u, is* true if and only if such-and-such *is* the case, either I must mean that it *is now* true or else what I am saying must be a potentially misleading abbreviation for the disjunctive tensed predication 'was, is now, or will be true'. In fact, of course, the latter interpretation is the one I should opt for in this instance (in order to state the relevant truth-conditions in their full generality, rather than just for presently existing sentence-tokens). Thus, where I put square brackets around the verb 'is', I mean this to be an abbreviation for 'was, is now, or will be'. The latter construction is admittedly rather clumsy, which is precisely why I am happy to abbreviate it. What I am insisting upon, however, is that *I,* at least, understand the foregoing statement of the truth-conditions of the tensed sentence 'It is now raining in Durham' as itself being *tensed,* because it makes predications of sentence-tokens, which are concrete, time-bound entities. But I appreciate, of course, that an adherent of the tenseless view of time would want to read each instance of 'is' within square brackets above as being a *tenseless* 'is'.

The reason why I lay so much stress on this point is to make it absolutely clear that there is no inconsistency in adhering to a tensed view of time while also endorsing a token-reflexive account of the truth-conditions of tensed sentences. There would only threaten to be an inconsistency here if one were to suppose that tensed sentences can be given *tenseless* token-reflexive truth-conditions. Of course, if one *uses* tenses in giving the truth-conditions of tensed sentences, there is a sense in which such an account of their truth-conditions cannot be fully explanatory of their meaning. But this is a familiar feature of truth-conditional semantics quite generally: for instance, quantifier phrases are standardly *used* in giving the truth-conditions of quantified sentences, on both objectual and substitutional accounts of the semantics of quantifiers. (One says, for example, that 'For some *x, Fx*' is true if and only if *there is some object* in the domain of quantification which satisfies the predicate '*F*'.) We have to live with the fact that certain notions are so fundamental that no reductive account of them can be supplied: the notions of existence and identity

are plausible candidates, but so too, I would urge, are the notions of past, present, and future. I take this irreducibility claim to be part of what the tensed view of time is committed to.[130]

It may be helpful at this point if I also dispose of another red herring, namely, McTaggart's 'paradox'. Famously, McTaggart condemned A-series terminology as being incoherent, on the grounds that once we use this terminology we are bound to say that *every* event is past, present, and future, despite the fact that 'past', 'present', and 'future' are incompatible predicates.[131] My own response—in which I agree with such philosophers as C. D. Broad and Quentin Smith[132]—is to deny that we are faced with even the appearance of a contradiction in the first place, because we are *not* bound to say that every event is past, present, and future. In my view, we are at most bound to say something like the following:

(3) For any event *e,* (i) it either was, is now, or will be true to say '*e* has happened', and (ii) it either was, is now, or will be true to say '*e* is happening now', and (iii) it either was, is now, or will be true to say '*e* will happen'.

This is, I admit, pretty much of a mouthful—which is why one may be tempted to abbreviate it in misleading ways. What it amounts to is the claim that for any event *e,* pastness can be predicated of it in at least one (but not necessarily more than one) of the three tenses, as also can *presentness* and *futurity.* Clearly, though, if—say—presentness is predicated of an event *e* in the past tense, then it may be that presentness cannot without contradiction *also* be predicated of *e* in either the present or the future tense. That is to say, if it *was* true to say '*e* is happening now', then it may be that it *is not now* and *will not be* true to say '*e* is happening now' (though it *is now* and *will be* true to say '*e* has happened'). But (3) by no means implies the denial of this and consequently cannot be charged with harbouring a contradiction.[133]

I should, it is true, acknowledge that matters are slightly complicated by the apparent fact that, even if it *was* true to say '*e* is happening now', then for that very reason it *was also* true to say (a little earlier) '*e* will happen'. But the proper way to respond to this point is to distinguish—as

[130] Michael Tooley would take issue with me here, but that is because he favours a non-standard conception of the tensed view of time: see his *Time, Tense, and Causation,* ch. 1.

[131] See J. M. E. McTaggart, *The Nature of Existence* (Cambridge: Cambridge University Press, 1927), ii. 20.

[132] See C. D. Broad, *Examination of McTaggart's Philosophy* (Cambridge: Cambridge University Press, 1938), ii, Pt. I, 313–14, and Quentin Smith, *Language and Time* (New York: Oxford University Press, 1993), 171.

[133] See further my 'McTaggart's Paradox Revisited', *Mind,* 101 (1993), 323–6.

Broad recognized that we should in any case[134]—between different *degrees* of pastness (and of futurity), something we do not have to do in the case of the present tense. Ordinary English accomplishes this by means of adverbial constructions like 'longer ago'. Thus we can say that although it *was once* true to say '*e* is happening now', *longer ago* it was true to say '*e* will happen'. (Later, however, I shall explain why even this suggestion may need to be modified.) Another minor complication is that, in the case of an event *e* of some duration, presentness *may* in fact be predicated non-contradictorily of *e* in, say, both the present tense and the past tense, though only in virtue of *e*'s having as parts two sub-events, *e*? and *e*=, such that presentness can only be predicated of *e*? in the present tense and can only be predicated of *e*= in the past tense.

3. Some Differences Between Tensed Theories

It will be noticed that although I spoke just now of presentness being predicated of an event *e* in the past tense, the way I construe this is in terms of saying that it *was true to say* '*e* is happening now'. There is one very good reason why I use this sort of metalinguistic construction, and this is that I don't want to suggest that 'presentness' is some sort of property of events. Some advocates of the tensed view of time would indeed want to suggest precisely this,[135] but I cannot agree with them. The problem is that if presentness (and likewise pastness and futurity) is conceived of as being a property of events, then it is difficult to see how it can *either* be a property which an event has always had and always will have, *or* be a property which an event now has, has had, or will have only temporarily—and no other option seems available. The first option appears to be quite untenable: it is surely absurd to say that the Battle of Hastings, say, always was and always will be present. According to the second option, however, presentness is a property which the Battle of Hastings *once* had, but which it has no longer. But how has it come to lose this property? We shouldn't be tempted to liken the case to that of a blue object losing its colour with the passage of time: objects can lose or gain properties because they *persist* through time while undergoing qualitative change—but events do not do this. The Battle of Hastings *no longer exists* now that it has 'lost' its 'presentness', unlike the blue object which has faded. It is true that persisting objects undergo not only qualitative change, but also *substantial* change,

[134] See Broad, *Examination of McTaggart's Philosophy,* 273.

[135] See e.g. Smith, *Language and Time,* ch. 5.

when they cease to exist by losing an *essential* property (as, for example, when a coin is destroyed by being squashed out of shape). But loss of 'presentness' by an event cannot be likened to substantial change, since the latter is the ceasing to exist of something that has persisted for a certain period—and events, once more, do not do this. It won't help, apparently, to think of an event's supposed loss of presentness as being a 'mere Cambridge change'—the sort of change which is undergone by a dead person who ceases to be famous—for this would imply that presentness is not an intrinsic property of events and hence its loss not a real change in the event possessing it. Nor, I think, should we say with Broad that we are talking here of a *special* sense in which properties can be gained or lost by events, a sense in which such 'changes' precisely *constitute* the 'passage of time'—for this is to indulge in a kind of talk about time which, though common enough, strikes me as being hopelessly obscure.[136]

However, now the charge may be raised against me by other adherents of the tensed view of time that in denying that presentness (and likewise pastness and futurity) is a *property,* I deny myself any means of explaining the distinctive semantic contribution of tenses to our talk about time.[137] What does an expression like 'the present moment' *mean,* if it does not involve ascribing the property of presentness to a moment of time? My response is twofold. First, not every adjective in the surface structure of everyday grammar should be construed as having the logical role of expressing a *property* of items of some sort. Sometimes such an adjective may effectively be playing the logical role of a sentential operator or predicate modifier. For example, possible-worlds semanticists typically claim that 'Possibly *P*' means 'In some possible world, *P* is true'—but one might be (in fact, I am) inclined to reverse the direction of explanation here, and say that this use of the adjective 'possible', if it is to be understood at all, is to be construed *not* as expressing some property of items of a queer sort ('worlds'), but rather in terms of the sentential operator 'Possibly'. (So, although I myself indulged in possible-worlds talk in Chapter 1, I did not intend this to commit me to a robust realism concerning such worlds.) Likewise, then, 'There is rain in Durham at the present moment' is, in my view, just a roundabout way of saying 'Presently, it is raining in

[136] C. D. Broad and Storrs McCall both maintain that we can legitimately use the language of change to characterize temporality provided we distinguish between change *in* time and change *of* time: see Broad, *Scientific Thought,* 64 ff., and McCall, *A Model of the Universe,* 30–1. As I remarked earlier (see section 1), I think that this suggestion is unhelpful, because there can be literally nothing in common between the two sorts of 'change': so why use the same word for both?

[137] See e.g. Smith, *Language and Time,* 166 ff.

Durham'—or, even more succinctly, 'It is now raining in Durham'. My second point is to repeat what I said before about certain notions being so fundamental that they are semantically irreducible—I take this view of the tenses. And why not? Don't we have to take the same view of an operator such as *negation*? 'It is not the case that' cannot be given a noncircular semantic explanation, yet of course we grasp its meaning as clearly as we grasp the meaning of anything.

At this point it may seem that my position with regard to the tenses is pretty much the same as A. N. Prior's, and yet in fact that is not so. This is connected with the fact that I use the metalinguistic constructions deployed earlier. Prior believed that the so-called tense operators could be iterated, allowing us to say things such as 'It was the case that it will be the case that such-and-such'.[138] But because I believe that tensed sentences have token-reflexive truth-conditions, I cannot accept this sort of locution as legitimate—any more than I can accept as legitimate a sentence like 'Over there it is raining here'.[139] The best we can do to make sense of the latter is to construe it as meaning 'Over there it is true to say "It is raining here"'. Likewise, then, instead of saying 'It was the case that it will be the case that it is now raining', I must insist on saying 'It was true to say "It will be true to say 'It is now raining'"'. In sum, then, I adopt the metalinguistic constructions exemplified above in order to avoid the difficulties of two versions of the tensed theory of time which I wish to reject: the view which treats presentness, pastness, and futurity as properties of events or moments, and the view which treats the so-called tense operators as iterable. (But I should stress that my recourse to such metalinguistic constructions is not at all indicative of a lack of metaphysical seriousness in my account of the nature of time.)

I should perhaps remark that in fact I differ from Prior also in *not* regarding the tenses as sentential operators, but rather as *predicate modifiers* : they can't, in my view, be sentential operators because any sentence on which they operated would have to have a *tensed verb,* so that at least *some* tensed sentences couldn't result from the application of a tense operator to a sentence—and if not these, then why any? Prior himself thought that the basic sentences from which all other tensed sentences were generated by the application of tense operators were *present-tense* sentences[140]—which is, in my view, to show a quite unjustified favouritism towards the present. No wonder, then, that Prior is often accused of 'presentism', an

[138] See A. N. Prior, *Papers on Time and Tense* (Oxford: Clarendon Press, 1968), 8.

[139] Cf. my 'The Indexical Fallacy in McTaggart's Proof of the Unreality of Time', *Mind,* 96 (1987), 62–70.

[140] See Prior, *Papers on Time and Tense,* 8.

implicit denial of the 'reality' of past and future.[141] No such charge can be levelled at me, precisely because I treat all three tenses as being on an equal footing.

This is not, however, to say that I think (as tenseless theorists of time typically do) that no ontological distinction whatever can be drawn between past, present, and future—an idea that has often been associated (rightly or wrongly) with some sort of fatalism or determinism. I am happy to allow, thus, that the law of excluded middle may not apply to all future tensed statements—that maybe, for example, it *is now* neither true nor false to say 'It will rain in Durham on 12 March 2099' or 'There will be a sea battle tomorrow'. (Incidentally, if this is correct, then I should at least qualify my earlier remark that if it *was* once true to say '*e* is happening now', then it *was also* true to say, earlier, '*e* will happen': for in many cases it could be that it was earlier *neither true nor false* to say '*e* will happen', even though it was later true to say '*e* is happening now'.) On this matter of 'future contingents', then, I side with what I take to be Aristotle's position.[142] But be that as it may, returning to the question of the status of the tenses in logical grammar, I repeat my view that they are *predicate modifiers*. To say that Durham will be rainy is to predicate raininess of Durham in the future-tense mode. And it is because Durham is a concrete, time-bound object that, in my view, properties like raininess can only be predicated of it in some tensed mode, either past, present or future.

4. The Tenseless View of Time and an Objection to It

I hope I have said enough now to explain my version of the tensed view of time and show that it is at least consistent and intelligible. But what of the tenseless view? What is it and why do I reject it? I do not have space to go into all my reasons for rejecting it in detail here, since my primary concern is to defend the tensed view and show that it commits me to an endurance account of persistence (of which more in due course). As for what the tenseless view *is,* I start from my characterization of it in section 2, as the view that the metaphysics of time need have recourse only to

[141] See e.g. Robin Le Poidevin, *Change, Cause and Contradiction* (London: Macmillan, 1991), 36 ff., where this doctrine is called 'temporal solipsism'. Quentin Smith uses the term 'presentism' to describe his own position in *Language and Time,* though he distances his position quite considerably from Prior's.

[142] See Aristotle, *De Interpretatione,* ch. 9, in *The Works of Aristotle,* ed. W. D. Ross, vol. i (Oxford: Clarendon Press, 1928).

B-series terminology, that is, to an account of time in terms of earlier/later relations between events or moments, together with relations like simultaneity which are definable in terms of earlier/later relations. I speak disjunctively here of events or moments, because some tenseless theories of time are 'substantival' theories, which regard moments of time as fundamental entities in their own right, while other tenseless theories of time are 'relational' or 'modal' theories, which attempt to construct moments of time (if they acknowledge their existence at all) out of events in some fashion. This is not a distinction with which I am particularly concerned here. I wish to reject all tenseless theories of time, both substantival and relational. Clearly, an essential feature of all tenseless theories is that they must regard tenseless predication as fundamental and hold that all tensed sentences can be given tenseless truth-conditions. (Such theories would, typically, endorse the token-reflexive account of the truth-conditions of tensed sentences exemplified in (1) and (2) of section 2, but insist that the 'is' in square brackets be interpreted *tenselessly* in each of its occurrences.)

Now, one objection to the tenseless theory of time that I have is that it doesn't tell us what it is for something to exist in time. Recall that, by my own account of section 2, what it is for something to exist in time is for that thing to be a subject of tensed predications—for it to *have had,* or to *have now,* or to *be going to have* some property.[143] Clearly, an adherent of the tenseless theory of time cannot appeal to any such consideration as this. But what else can he say? Perhaps he could say that for something to exist in time is for it to have (tenselessly) some property *at some moment of time,* or for it to have (tenselessly) some property *simultaneously with some event* (though the latter version will require an account of eventhood which, problematically, does not already presuppose a notion of existence in time). But then it won't be clear why we shouldn't say, for example, that *the number 4* exists in time, because it won't be clear why we shouldn't say that 4 has (tenselessly) the property of being the square of 2 at *every* moment of time, or simultaneously with *every* event. (My own view, of course, is that 4 does indeed have this property tenselessly, but that for this very reason it *doesn't* have the property *at* any moment of time; however, this is a proposal which is evidently not available for the tenseless theorist to adopt, because he obviously can't allow that to predicate a property of an object tenselessly is *ipso facto* to imply that the object does not possess the property at any time, since *all* of his predications are ultimately tenseless.)

[143] In order to make this proposal work effectively, we may need to restrict the properties in question to *intrinsic* ones, so as to avoid having to say, for example, that the number 4 exists in time because it *has had* the property of being someone's favourite number.

Now, if the tenseless theorist responds by saying that the number 4's having (tenselessly) the property of being the square of 2 is not an *event,* or *temporal state of affairs,* and for that reason doesn't occur 'at' any time and isn't simultaneous with any event, then we need to be told what *does* count as an 'event'. It hardly helps to say that a state of affairs is 'temporal', and so 'in time' and an 'event', just in case it *enters* (*tenselessly*) *into temporal relations* with other states of affairs (for instance, by being earlier or later than other states of affairs). For, once again, what is then to prevent us from saying that 4's being the square of 2 is a 'temporal' state of affairs in virtue of standing in the temporal relation of simultaneity to every other state of affairs? That this would apparently require us to abandon the assumption that simultaneity is an equivalence relation does not seem to me decisive; after all, there is a long tradition of theological thinking, beginning with Boethius, which holds, without obvious incoherence, that God's thoughts are simultaneous with everything that happens at every moment of time. In any case, even if this objection were deemed decisive, what would prevent us from saying instead that 4's being the square of 2 is a 'temporal' state of affairs in virtue of having *successive temporal parts,* each of them earlier than, later than, or simultaneous with some other state of affairs? In short, the proposal now under consideration simply fails to perform the task demanded of it, namely, that of explaining why a state of affairs such as 4's being the square of 2 should not be regarded as an *event* (perhaps an infinitely protracted and boring one) and so as something existing 'in time'. (It obviously won't do just to say that 4's being the square of 2 isn't an event because it is an *abstract* state of affairs, if one's criterion of the abstract appeals to the very notion of existence in time—that is, if one distinguishes the abstract as that which does not exist in time.)

My own view (again a broadly 'Aristotelian' one) is that events are changes (and unchanges) in the properties and relations of persisting objects, so that to say that some event occurred is to say that some object or objects changed or remained the same in certain ways—the objects in question being, of course, ones *existing in time.* So my account of events already presupposes the notion of existence in time, and thus is not available to the tenseless theorist of time for current purposes. The tenseless theorist may perhaps appeal, instead, to *causation* as a criterion of eventhood, saying that events are states of affairs which have (tenselessly) causal relations to other states of affairs—which might appear to exclude from the class of events the state of affairs of 4's having (tenselessly) the property of being the square of 2. But this presupposes, implausibly, that causation can be understood independently of the notion of existence in time. On any plausible account, to identify *a* as a cause of *b* is *first* to say

of *a* and *b* that they *occur*(*red*) at certain times, and *then* to say something further about their relationship to one another.[144]

Now, I don't want to claim that the objection which I have just raised to the tenseless theory of time is absolutely insurmountable—obviously, I can't anticipate every possible rejoinder that might be made to it—but it does seem to me unsurprising that the theory should be open to such an objection. After all, the theory is committed to saying that there is nothing fundamentally different about predicating a property of some abstract, timeless object and predicating a property of something existing in time; in both cases, tenseless predication supposedly suffices. It is unsurprising, then, that the theory should be open to the charge that it offers not merely a *tenseless,* but a *timeless,* view of time, and thereby eliminates the very phenomenon which it is supposed to explain.

5. Theories of Persistence and the Notion of 'Temporal Parts'

I want to move on now to the problem of *persistence.* As I remarked in the opening paragraphs of this chapter, theories of the persistence of objects through time are commonly divided into two classes: *perdurance* theories and *endurance* theories. Standardly, the theories are characterized as follows.[145] According to the perdurance account, an object persists through time by having different temporal parts at different times at which it exists, whereas according to the endurance account, an object persists through time by being 'wholly present' at each time at which it exists. (I have to say that I find the expression 'wholly present' less than fully perspicuous, but I take it to mean, at the very least, that persisting objects do *not* have temporal parts.) The debate turns, then, on the question of whether or not persisting objects have temporal parts.

Unfortunately, the very term 'temporal part' has a number of different possible meanings, and is very difficult to clarify in any useful sense. One thing we need to be clear about is that the notion of a temporal part of a

[144] Certainly, that is the way in which both David Hume and David Lewis approach the analysis of causation: see David Lewis, 'Causation', in his *Philosophical Papers,* vol. ii (New York: Oxford University Press, 1986).

[145] See further Lewis, *On the Plurality of Worlds,* 202. See also my 'Lewis on Perdurance versus Endurance', *Analysis,* 47 (1987), 152–4, reprinted in H. Noonan, ed., *Identity* (Aldershot: Dartmouth, 1993). In this paper I criticise an important argument offered by Lewis in support of the perdurance theory. I argue more positively on behalf of the endurance approach in my 'Substance, Identity and Time', in my 'Primitive Substances', and in Chapter 5 below.

persisting object is not, for the purposes of the perdurance versus endurance debate, to be assimilated to the notion of a *temporary* part of a persisting object. The leg of a chair might be a temporary part of it, if it is a replacement for the original leg while the latter is undergoing repair. But such a chair leg is itself a persisting object, which will itself have temporal parts if all persisting objects do. Of course, some philosophers apparently do hold that at least some temporal parts of persisting objects are themselves persisting objects—as when David Lewis likens a temporal part of a person to a short-lived person.[146] But, clearly, this is not a view which a perdurance theorist would do well to take about all temporal parts, since that would deprive him of any non-circular account of persistence. Sometimes, temporal parts of persisting objects are purportedly introduced to us as entities representable by ordered pairs of objects and times—for instance, by the pair 〈Napoleon, 5 June 1805〉 -—and such an entity, we are led to suppose, might be referred to by a complex noun phrase such as 'Napoleon on 5 June 1805'. Whether one can concoct entities in this easy fashion is a matter for debate, but even if one can, it seems plain that a temporal part thus conceived is both conceptually and ontologically posterior to the persisting object (here, Napoleon) of which it purports to be a part. So jejune a notion of temporal part accordingly seems of little use in a metaphysical account of the persistence of objects—as is demonstrated by the fact that even an endurance theorist need apparently have no special qualms about countenancing the existence of temporal parts thus conceived.

Is there, then, *any* acceptable notion of temporal part that is robust enough to serve a useful metaphysical purpose? Well, it is sometimes urged that *events and processes,* at least, clearly have temporal parts in a robust sense of this sort. (I take a process to be a sequence of temporally successive events, the events in the sequence being parts of the process.) We talk, after all, of such items as an early part of the performance of a certain play, such as the performance of its first scene. In like manner, we may talk of an early or late part of a persisting object's *existence* or life—though here I would agree with those who insist that this does not of itself entitle us to think that there are such entities as early or late parts *of that object.* But still, it may be urged, even if it is indeed open to debate whether such entities exist, at least we have now hit upon an intelligible way of talking about the supposed temporal parts of persisting objects which can be put to use in the metaphysical debate as to whether or not such objects persist

[146] See David Lewis, 'Survival and Identity', in his *Philosophical Papers,* vol. i (New York: Oxford University Press, 1983), 76.

by perduring. (If we couldn't even talk intelligibly about the possibility of objects having such parts, the debate could never get started; though I suppose some might say that that would be no bad thing.)

Now, I don't think it would necessarily be fair to protest that to model the supposed temporal parts of persisting objects upon the supposed temporal parts of processes in this way is simply to reduce persisting objects to processes. (Certainly, though, I would want to reject any such reduction because, as I explained earlier, I take an 'Aristotelian' view of events and processes as consisting in changes and unchanges in the properties and relations of persisting objects.) Even so, I have serious doubts about the attempted analogy with events and processes. For I am not sure that even they have 'temporal parts' in any metaphysically significant sense. The performance of the first scene of a play is, no doubt, a *part* of the performance as a whole. (Processes, as I said a moment ago, are sequences of events, which are parts of them.) But in what sense is the performance of the first scene a *temporal* part of the whole performance? In the sense that it occurs, or comes into existence, before the rest of the performance? But if that were all there were to its being a temporal part, then, it seems, the proposed analogy between the 'temporal parts' of events and the 'temporal parts' of persisting objects would require us to regard the *temporary* parts of persisting objects as 'temporal parts' of them. After all, the replacement leg of a chair, which is a temporary part of it, may come into existence before or after certain other of its parts; so that if all that is required for something to be a temporal part of a persisting object is that it be a part of it and come into existence before or after other parts of it, then the replacement leg is as good an example of a 'temporal part' of the chair as anything could be. Nor will it help much to point out that an 'earlier' part of the performance of a play *ceases to exist* before its 'later' parts begin to exist, whereas the temporary leg of a chair may go on existing even after it has been replaced as a part of the chair—for, clearly, the temporary leg could perfectly easily be destroyed in the course of removing it from the chair. Indeed, some temporary parts of persisting objects *have* to be destroyed in the course of removing them from the objects in question: for example, certain living parts of organisms. It is true that, at the time at which the 'later' parts of the performance of a play exist, none of the 'earlier' parts still exists. But equally, in the case of a chair, there may be a time at which none of the parts—legs, arms, seat, and so forth—which it had at some former time still exists, all having been destroyed and replaced by newly fashioned parts. Are we then to say that such parts of a chair are *temporal* parts of it? If we do, we shall clearly not be deploying a notion of 'temporal part' which can have any relevance to the debate between perdurance and endurance theorists of persistence, because such parts of a

chair are themselves just other persisting objects about the nature of whose persistence the debate is concerned.

My own view is that if any metaphysically significant notion of the temporal parts of persisting objects is to be constructed, then the proper analogy to make is not with items like the performance of the first scene of a play, but rather with the *spatial* parts of concrete things (whether these be persisting objects or events). And here I would point out that by a spatial part of, say, a chair, I *do not* mean something like one of its legs. Rather, I mean a spatially extended entity whose spatial boundaries are defined in relation to the chair: something such as the bottom three inches of one of its legs, or the left-hand half of its back as seen from the front. Clearly, concrete things can only have spatial parts thus conceived if the things in question are *extended in space* (this applies just as much to events as to persisting objects). By the same token, then, concrete things can only have *temporal parts,* in the sense in which I want to speak of them, if those things are *extended in time.*[147] By this account, a temporal part of a persisting object would be a temporally extended entity whose temporal boundaries are defined in relation to that object. (One minor refinement has to be made at this stage: just as we may, in principle, need to admit two-, one-, and zero-dimensional spatial parts of things in addition to three-dimensional ones, so too we may need to admit zero-dimensional temporal parts of things if we admit one-dimensional ones—but nothing crucial hinges upon this point, since what is important is that we must indeed be prepared to speak of temporally *extended* entities if we are to talk of temporal parts in any metaphysically significant sense.)

So, then, a temporal part of Napoleon, if such an entity exists, would be a temporally extended entity whose temporal boundaries are defined in relation to Napoleon—thus the boundaries of one such part might be fixed by the date of his birth and the date of his tenth birthday. One might try to refer to such an entity by some such complex noun phrase as 'Napoleon up to the age of ten'. (This notion of temporal part is, I believe, quite distinct from the 'ordered pair' conception discussed earlier, because the latter conception involved no commitment to the existence of *temporally extended* entities of any sort. And this is not just because each such pair contained only a single time: for, in the first place, it was not implied that the time in question had to be *momentary*—the example I gave actually specified a *day*—and, secondly, no material difference would have been made if instead of ordered pairs we had talked of ordered triples,

[147] Here, I believe, I may be in agreement with Robin Le Poidevin, even though he wants to say that things *are* extended in time whereas I want to deny this: see Le Poidevin, *Change, Cause and Contradiction,* 60 ff.

each containing *two* times, for there would still have been no commitment to the existence of temporally extended entities.) What emerges from all this, if I am correct, is that the perdurance versus endurance debate doesn't really hinge upon issues in mereology (the study of part–whole relations) as such, but rather upon the question of whether *anything*—and here I include not only persisting objects but also events and processes—is *extended in time,* in anything like the way in which things are *extended in space*. But this is at bottom a question about the nature of time, rather than a question about the nature of things existing in it. The question is whether we can properly talk about time as being some sort of dimension of reality, relevantly akin to the three dimensions of space. (A word of caution here: there is an abstract or purely formal notion of dimensionality used, for instance, to describe perceptible colours as differing from one another along the three independent 'dimensions' of hue, brightness, and saturation—but in what follows I am concerned with a much more robust notion of dimensionhood for which spatial length, breadth, and height constitute the paradigm, all of these providing independent ways in which concrete things can be *extended*.)

6. Can Anything Be Extended in Time?

Our question, then, is this: can we properly talk about time as being a dimension of reality in which concrete things are extended? I think that our answer to this should depend on whether we believe that the tensed or the tenseless view of time is correct. If the tensed view is correct, then I think we cannot properly regard time as being such a dimension of reality, and accordingly cannot accept a perdurance account of the persistence of objects, given my understanding of what such an account implies (namely, the existence of temporally extended entities). Now, it is not my current task to demonstrate beyond all question that the tensed view of time is correct. The most I hope to do is to show why the tensed view *cannot,* while the tenseless view must, regard persisting objects as being temporally extended.

Since space provides the paradigm of extension, we can conceive of time as a dimension in which things can be extended only in so far as we can find suitable similarities between space and time. The only case that can be made for there being a relevant similarity, it appears to me, rests upon a comparison between the relations between different points on a line and the relations between different times. Now, the tenseless theory of time, with its exclusive reliance on B-series terminology, does indeed make space and time appear relevantly similar. For, on this view, the earlier/later

relations between times (and events) suffice to define a 'betweenness' relation on them which is entirely analogous to the betweenness relation of points on a line. (A time *t* is *between* two other times *t*? and *t*= just in case *t* is later than *t*? and earlier than *t*= or *t* is earlier than *t*? and later than *t*=—and similarly with events; moreover, *all* times are thus related to one another, in a unique linear sequence.) Quite crucial here is the fact that the tenseless theory makes *no ontological distinction* between different times, nor between the existence of things *at* different times—for this precisely parallels the spatial case. Of course, there is still the *anisotropy* of time—its directedness—to consider, but this doesn't appear to be a particularly important difference between time and space as far as the tenseless theory is concerned, or, at least, not important enough to undermine the theory's commitment to an extensional view of time.

There seems, then, to be no good reason why a tenseless theorist of time should regard space, but *not* time, as being a dimension of reality in which things are extended. But matters are, I believe, quite otherwise for the tensed theorist of time. For him the fundamental notions are of past, present, and future, which have no spatial analogues. It is true, no doubt, that the tenseless theorist will urge that there is a close parallel between 'now' and 'here': but the tensed theorist should vigorously deny this, because while he may happily allow that the truth-conditions of sentences containing spatial indexicals such as 'here' *can* be stated in a metalanguage which does not itself deploy spatial indexicals, he will—as we have seen—be well advised to hold in contrast that tensed sentences can only be provided with tensed truth-conditions. In short, the tensed theorist may agree with the tenseless theorist about the semantics of 'here', but should not do so about the semantics of 'now'.

On the tenseless view, any event *e is tenselessly* between at least two other events *e*? and *e*=—with the possible exceptions of a first and a last event at the ends of time—just as, on this view, any point is tenselessly between at least two others on a line. But on the tensed view, although *e* can be said, for example, to *have occurred less long ago than e*? *and longer ago than e*=, this doesn't license us to say that *e* has or had some 'betweenness' relation to *e*? and *e*= in anything like the sense which obtains in the spatial case. For, on the tensed view, *e*? had already *ceased to exist* when *e* came into existence, and the latter had ceased to exist when *e*= came into existence. Accordingly, we do not have here a relationship between entities which are in any sense *coexistent,* and for that reason not one at all like that between points on a line. Now, it is true that a tenseless theorist will also say that, in one sense, *e, e*?, and *e*= do *not* coexist—namely, in the sense that they do not all exist *at the same time*. Yet, for the tenseless theorist these events do still coexist in another sense, in as much as it is

tenselessly true of all of them that they exist, *simpliciter*—for, on the tenseless view, '*e* exists at *t*' clearly entails '*e* exists', *simpliciter*. (If you like, for the tenseless theorist all these events coexist, tenselessly, *in the same possible world*—the actual world—and differ not at all from one another in respect of their ontological status within that world, but only in respect of their temporal location within in.) Clearly, it would indeed be simply mistaken to describe the tenseless theorist as treating all events as being *cotemporal*. But the 'co' in 'coexistent' need not be taken to mean 'at the same time'—it may be taken to mean 'together' in some other sense, if one is available. And then the point is that for the tenseless theorist another such sense is undoubtedly forthcoming, whereas for the tensed theorist there is simply no sense in which *e, e*?, and *e*= can be said to coexist, because on this view existence can *only* be ascribed to them in a tensed way—and in that way they cannot be said to coexist.

My claim, then, is that any 'betweenness' relation relevantly akin to that relating points on a line is a relation between items which must in *some* sense coexist—but that the tensed theorist allows no such sense for events separated in time. And this is why I conclude that the tenseless theory alone treats time as a dimension of reality in which things are extended, and accordingly treats persisting objects as having temporal parts (in the only metaphysically significant sense available) and so as *perduring*—that is, as persisting over time by virtue of having different temporal parts at different times. On my version of the tensed view, by contrast, to say that a presently existing object has persisted is just to say that that very object *did* exist in the past and still does so now. There is, on this view, no implication whatever that in order for this very object to have persisted until now, some *other* object (a temporal part of it) must have existed in the past. Notice here that, in the spatial case, it does seem intuitively right to say that a spatially extended object, such as the earth, exists now *elsewhere* than here (where 'here' refers, say, to where Durham is) by virtue of having spatial parts which now exist in other places (for instance, where San Francisco is); and the same applies, on a smaller scale, to objects like chairs. But, as I say, the verdict of the tensed view is that nothing analogous applies in the temporal case. And, for what it is worth, I consider it to be a distinct merit of the tensed view of time that it delivers this verdict, for it surely coincides with the verdict of common sense.

This is not the end, however, of our examination of the notion of persistence and disputes over the nature and existence of temporal parts, which we shall pursue further in the next chapter. For although my own opinion is that a tensed theory of time is preferable to a tenseless theory, and that only the latter can (and must) find a place for temporal parts of persisting objects, it is possible and indeed desirable to discuss the rival

claims of endurance and perdurance theories of persistence at some remove from deeper issues concerning the nature of time itself. In fact, if I am right in believing that one's theory of time must in some measure be dictated by one's theory of persistence and vice versa, one way to defend a particular theory of time (in my own case, a tensed theory) will be to argue for a particular theory of persistence—which is what I shall be doing in the next chapter.

5 Persistence and Substance

In the previous chapter I argued that an 'endurance' theory of persistence goes naturally with a tensed view of time whereas a 'perdurance' theory is suited to a tenseless view. As it is standardly understood, the endurance/perdurance distinction is between those theories which maintain that an object persists by being 'wholly present' at more than one time and those theories which maintain that an object persists by having different temporal parts which exist at different times. But this is not the only way to classify theories of persistence and not, I think, even the most perspicuous way. Indeed, some theories of persistence do not fit altogether comfortably into the two proposed classes. So, although I shall return to the endurance/perdurance distinction later in this chapter, I shall begin by examining the merits and drawbacks of three rival accounts of persistence, only one of which is immediately identifiable in terms of that distinction. I call these accounts the *property instantiation* approach, the *temporal parts* approach, and the *substantial constituents* approach. I shall be arguing that the first two approaches are untenable, while the third has the implication that at least some cases of diachronic identity must be 'primitive' or 'ungrounded', in the sense that in these cases the identity of an object over time cannot be said to 'consist in' any further fact or set of facts of a more basic nature. I shall then go on to argue that support for the substantial constituents approach emerges from considerations to do with the nature of time itself—in particular, from the fact that the *unity* of time (and, by the same token, the unity of the world as *one* world in time) depends ontologically upon the existence of persisting substances.

Towards the end of the chapter, I shall reinforce the substantial constituents approach by challenging David Lewis's arguments in favour of a temporal parts solution to what he calls the *problem of intrinsic change*. I shall argue that the problem has two aspects, one semantic and the other metaphysical, and that the substantial constituents approach can cope with the metaphysical aspect while the semantic aspect is catered for by an 'adverbial' construal of tenses as predicate modifiers. It will emerge that the substantial constituents approach qualifies as an 'endurance' theory of persistence, in as much as it involves a repudiation of the doctrine of temporal parts; but I may as well register straight away my dissatisfaction

with the label 'endurance theory': my main objection being that it really only serves to characterize a theory of persistence negatively, as *not* invoking temporal parts, and thus that the very distinction between endurance and perdurance theories is one which plays into the hands of temporal parts theorists by making the truth or falsity of *their* theory the central issue concerning persistence. In this way, 'endurance' theories tend to appear as mere foils for temporal parts theories, and at the same time can seem rather thin, especially if their proponents insist (as I certainly do not) that persistence, or identity over time, is always primitive, even in the case of composite macroscopic objects which are capable of surviving a change in their component parts.

1. The Problem of Persistence

Imagine the following situation. A tomato is sitting on a certain table—in fact, it has been sitting there for the past five minutes. In this situation, someone might ask: 'What makes the tomato that is now sitting on the table the same tomato as the one that was sitting there five minutes ago?' Perhaps that question sounds crazy—the sort of question that only a philosopher could ask. One might be inclined to respond, fairly brusquely: 'Nothing *makes* it the same tomato: it just is the same and that's all there is to say about the matter.' If pressed a little further, however, one might continue: 'Look, five minutes ago a tomato was sitting on the table. It stayed there, undisturbed, for five minutes. At no time was the tomato removed from the table and replaced by another. And that is why the very same tomato is still there now, five minutes later.' 'But,' the questioner might go on, 'in virtue of what did that original tomato *persist*—what kept *it,* that very tomato, in being?' Again this might seem to be a crazy-sounding question. Surely—it may be urged—one is not called upon to explain why something like a tomato should continue to exist from one moment to the next. One may indeed be called upon to explain the *coming-to-be* or the *ceasing-to-be* of a tomato, but surely not its *continuing-to-be*. Isn't the request for an explanation of the tomato's persistence rather like a request for an explanation of an object's continuing to move with a uniform velocity when not acted upon by any force? Perhaps we could even speak by analogy of a 'law of existential inertia'.[148] I am inclined think that there is something right about this no-nonsense

[148] In fact, modern physics *does* embrace what seems to amount to just such a law, in the form of the law of the conservation of mass/energy (though, obviously, one could hardly appeal to this law *directly* in the case of something as complex as a tomato).

response—but I also think that quite a lot of work needs to be done to earn the right to issue it. And even then, I do not consider that the response, in unqualified form, is appropriate in the case of things like tomatoes.

So far a number of subtleties have been glossed over. For one thing, there is a distinction to be made between *explaining* a tomato's persistence and saying what that persistence—the tomato's 'diachronic identity'—*consists in*. For another, it won't do just to say that the persistence of something like a tomato calls for no explanation, without saying in some detail what exactly it takes to be something like this. For, of course, if we change the example to one concerning a very different sort of entity—say, a trumpet-blast—then the questions which earlier sounded somewhat crazy transform into quite sensible ones. But, then, what exactly *is* the relevant difference between a tomato and a trumpet-blast? The tomato, one might want to say, is a *continuant*—or, if one is old-fashioned, a *substance*—while the trumpet-blast is a *process*. Well and good, but so far this is just fancy labelling. What *is it* for something to be a 'substance'? A quick response would be: it is to be something whose coming-to-be or ceasing-to-be calls for an explanation (these being 'substantial' changes), but whose continuing-to-be does not. But this response would be *too* quick. For it is far from clear yet that by this definition a tomato—or indeed *anything*—will qualify as a substance.

Let us return to the distinction between explaining a thing's persistence and saying what its persistence, or its diachronic identity, 'consists in'. I take it that what is involved here is the quite general distinction between providing a causal explanation of the occurrence of a phenomenon and saying in some revealing way what that phenomenon really is—disclosing its 'real essence'. (Compare the distinction between saying why lightning occurs and saying that what lightning *is* is an electrical discharge.) However, even granting this important distinction, it seems clear that the two sorts of concern will be intimately related. In particular, it may well be urged that if no explanation of a thing's persistence *could be* forthcoming, this might be precisely because its persistence could not be revealed to consist in anything independently understandable. And, indeed, I strongly suspect that this is how matters stand with respect to some of the things we are inclined to call substances—though not, I think, with respect to tomatoes. However, in what follows I shall leave aside questions concerning the explanation of persistence in favour of questions concerning the 'essence' of persistence.

To be in a position to say in what a thing's persistence consists is, in more familiar terminology, just to be able to supply a *criterion* (or 'principle') of diachronic identity for that thing, and, more generally, for things

of its sort. (In saying this I presuppose that a 'criterion' in the present context is not to be understood as an *evidential* or *heuristic* principle, but rather as a metaphysical-cum-semantic one: recall our discussion of this point in Chapter 2.) In these terms, then, what I wish to maintain is that there are some sorts of persisting things (not, however, including tomatoes) for which no such criterion of identity can be supplied. In the case of things of these sorts, identity through time is *primitive* or *ungrounded* (as I shall put it). I believe, for reasons which I shall try to make clear, that there *must be* ungrounded identities—ultimately because the notion of there being such identities underpins our very conception of time itself. (The thought is not altogether novel, having strong Kantian echoes. But I hope that in its detailed development I may have something new to offer; and, as I made clear in Chapter 1, my conception of the status of metaphysical truths is, in any case, far from being a Kantian one.) To this it may be objected—before I even begin—that no legitimate advance may be made from *our conceptions* to *how things must be*. Now, in a way I readily grant this. It just might be the case, after all, that time itself is unreal—merely an illusion. I do not believe that there is any positive reason to think that this is so, as will be clear from the previous chapter (in particular, from my disagreement with McTaggart's views about time)—and in Chapter 7 I shall even question the very coherence of the suggestion that time might be unreal. But, setting that deeper issue aside for now, it still remains open to us to try to establish a *conditional* necessity of a genuinely metaphysical sort: that if time is real, then, of metaphysical necessity, there are ungrounded identities in the sense in which I speak of them. (Here it may be helpful, once again, to recall some of the discussions of Chapter 1 concerning metaphysical necessity and the nature of metaphysical argument in general.)

2. The Property Instantiation Approach

In what terms might one hope to supply a criterion of diachronic identity for something like a tomato? (The chosen example may seem to be a banal one: but its usefulness lies precisely in the ordinariness and familiarity of the kind of object in question.) I think that there are three general approaches that one might take, which I shall call the *property instantiation approach,* the *temporal parts approach,* and the *substantial constituents approach,* respectively. I shall argue that the first and second of these approaches are inadequate while the third, which is adequate, demands the existence of ungrounded identities. Hence, if no other approach is forthcoming, this may at least be taken as establishing the credentials of

the thesis that there are ungrounded identities. Later I shall advance a positive argument in its favour.

According to the property instantiation approach, the diachronic identity of a tomato is grounded in some spatiotemporal-cum-causal condition on the instantiation of tomatohood—the crudest version of the theory being that the identity is grounded simply in the *spatiotemporal continuity* of such instantiation.[149] That is to say, what supposedly makes it the case that the tomato now sitting on the table is the same tomato as the tomato sitting on the table five minutes ago is that there is a spatiotemporally continuous sequence of place-times stretching from the place-time occupied by the tomato on the table five minutes ago to the place-time occupied by the tomato on the table now, such that tomatohood has been fully instantiated at each place-time in this sequence. (We have to say '*fully* instantiated' so as to exclude, for instance, a case in which the original tomato is largely destroyed and a tomato is subsequently miraculously generated from the remnants: for in such a case one would rightly be reluctant to *identify* the later tomato with the earlier one.) Obviously, it is not important to this account whether or not our tomato has been removed from its table and then returned during the five-minute period—which is as it should be.

Now, one objection which might be raised against the foregoing account is that it rules out a priori the possibility of interrupted or intermittent existence for something like a tomato. I think that this sort of objection is probably correct, far-fetched though it may seem. But it would appear that it is not fatal to the property instantiation approach in general. For instance, one might, consistently with this approach, loosen the requirement on spatiotemporal continuity while at the same time adding a *causal* condition to distinguish between cases of the interrupted existence of the same tomato and cases of the annihilation of one tomato and its later replacement by another one created *ex nihilo*. The condition would be something to the effect that in order for later instantiations of tomatohood to ground the identity of the *same* tomato as earlier instantiations, the later instantiations have to be causally dependent on the earlier instantiations in certain appropriate ways. (Such a condition will arguably be needed in any case, so that its invocation here should not be seen as being merely *ad hoc*.)

But there is, I think, another far more serious objection of principle to

[149] It may be wondered why I speak of the instantiation of *tomatohood,* as opposed to that of some cluster of non-sortal properties (such as size, shape, colour, and so on). My reason is that I do not believe that sortals are definable in terms of such properties: but anyone who thinks otherwise is at liberty to take my use of the term 'tomatohood' as merely abbreviatory.

the property instantiation approach. This begins to emerge once we ask what could possibly be *meant* by saying that tomatohood is 'fully instantiated' at a certain place and time. Just this, surely: that *a tomato* exists at that place and time. In fact, matters are a little more complicated than this, but only in a way which makes things even more obviously difficult for the property instantiation approach. For that approach to stand any chance of success, it is crucial that talk of the 'full' instantiation of tomatohood at a certain place and time should be construed in such a manner that the possibility of *multiple* instantiations at that place and time is set aside. For otherwise the approach will not be able to handle, for instance, a case involving one tomato amongst a stationary bunch of contiguous tomatoes. In such a case, tomatohood is multiply instantiated within a certain region of space during a certain period of time. Now, the theory must be able to tell us what it is for a *particular one* of those tomatoes to persist throughout that period of time. But it won't do just to say that, between the place-time occupied by that particular tomato at the beginning of the period and the place-time occupied by it at the end of the period, there is a spatiotemporally continuous sequence of place-times at which tomatohood is 'fully' instantiated (even if it is additionally stipulated that these successive instantiations are causally related to one another in an appropriate way). For, evidently, the *whole region* occupied by the bunch of tomatoes has tomatohood 'fully' instantiated at it throughout the period in question, so that the proposal under consideration doesn't discriminate adequately between the persistence of the particular tomato in question and the persistence of the whole group of tomatoes. Thus, for the purposes of the theory, the 'instantiation of tomatohood' at a certain place and time has to be interpreted more accurately as meaning the 'full and *singular* instantiation of tomatohood' at that place and time. But this only serves to bring out more clearly than ever that what this talk of the ('full and singular') instantiation of tomatohood a certain place and time amounts to is just talk of the existence at that place and time of *exactly one whole tomato*. However, existential talk of the latter kind evidently *presupposes*—and hence cannot help to provide—an account of the identity-conditions of tomatoes. For to speak of the existence of *exactly one* tomato is to speak of the existence of *one and the same* tomato. (I am assuming here—I take it uncontroversially—that, in the terminology of Chapter 3, tomatoes are 'individual objects'.)

To this it may be replied that all that is really being presupposed is an account of the *synchronic* identity-conditions of tomatoes, whereas what is now at issue is the question of their *diachronic* identity-conditions. My response would be to put pressure on the assumption that the synchronic and diachronic identity-conditions of things like tomatoes are independently

intelligible. Clearly, it is not an *inessential* property of tomatoes that they are things of a kind whose typical exemplars persist through time (even if we can make sense of the thought of this or that particular tomato having only a very short-lived existence). And so a synchronic identity criterion for tomatoes which failed to reflect this fact could not properly be represented as a criterion for the synchronic identity of *tomatoes,* as opposed, say, to qualitatively similar objects of a more ephemeral sort (such as, perhaps, the putative *temporal parts* of tomatoes with which we shall shortly be concerned). A synchronic identity criterion for tomatoes should tell us under what conditions we have to do with one and the same *tomato*—as opposed to two distinct *tomatoes*—at a certain time: and this cannot in general be a matter untouched by considerations of prior and subsequent existence, given the persistent nature of things that are of the tomato kind.

This claim might, however, be challenged on the following grounds. A necessary and sufficient condition for the diversity of tomatoes at a given time, it may be said, is the diversity of their *locations* at that time, because no two tomatoes can occupy precisely the same place (nor even, indeed, partially overlapping places) at the same time. And this, it might seem, is a condition the satisfaction of which is untouched by considerations of prior or subsequent existence. However—while accepting, of course, the principle that tomatoes exclude one another from the same place at the same time[150]—I do not accept that this principle does not rest upon assumptions concerning the diachronic identity of tomatoes, nor do I accept that it can be appealed to on its own as providing a criterion of synchronic identity for tomatoes: for, on the contrary, it seems to me that this is a principle which must, if anything, be seen to emerge from such a criterion rather than to constitute it. I shall take these two points in turn.

First we should appreciate that the capacity of an object to exclude another from the place it occupies is one that can only be exercised in the course of a finite period of time, not just instantaneously: so the ascription of such a capacity to an object actually *presupposes* that it is a thing of a persisting kind. (Certainly this is so if, as is clearly the case here, we are thinking of an object's capacity to exclude another from the place it occupies as a kind of *impenetrability.*) Secondly, however, we need to ask just what it is about tomatoes that confers upon them this special power of mutual place-exclusion—a power not possessed by objects of many

[150] To accept this is not, obviously, to deny that a place (region of space) may contain a *bunch* of tomatoes, but only to imply that in such a case the place in question must be divisible into disjoint sub-regions each of which contains no more than one tomato. (It was, of course, in this uncontentious sense that I spoke earlier of the multiple instantiation of tomatohood at the same place and time.)

other kinds, such as shadows and beams of light. We can, after all, easily imagine two objects which *look* very much like tomatoes approaching one another and merging together; though the very fact of such a merger would disqualify these objects from being classified as *tomatoes*. Perhaps the most tempting answer is to say that what is distinctive about tomatoes is that they are *material* objects: different tomatoes are composed at any given time of different portions of matter—and different portions of matter themselves, it may be said, exclude one another from the same place at the same time. Impenetrability, after all, is often regarded as one of the essential properties of matter. (Recall here our discussion of material stuffs in Chapter 3—though there we had in mind putatively homogeneous stuffs.)

Now, this answer will certainly *not* do just as it stands, because it fails adequately to accommodate such mundane facts as that a quantity of water may seep through a piece of porous clay pot. (For this to happen, mustn't the water pass through *the place* occupied by the pot—since it must pass through the pot occupying that place?) Of course, one may refine what is meant by 'existence in the same place' so as to exclude such cases—stipulating, perhaps, that two things 'exist in the same place', strictly speaking, only if there is no spatial location *within* that place which is occupied by part of one of those things but not by part of the other. (The water, we suppose, can seep through the pot because parts of the water can occupy spatial gaps between parts of the pot.) But, what is more to the point, the answer we are now envisaging already presupposes some grasp of what makes for the identity and diversity of *portions of matter* and *their* persistence-conditions, from which a grasp of the exclusion principle for portions of matter must somehow be seen to emerge if it is finally to be endorsed at all. A grasp of that principle—the principle that different portions of matter exclude one another from the same place at the same time—cannot itself be *constitutive* of our putative understanding of the identity and diversity of portions of matter, for two reasons. First, because it is a *mutual* exclusion principle and hence, in the absence of a prior specification of what qualifies as a single and distinct *portion of matter,* it only tells us that one thing, of an as yet unspecified kind, excludes another thing of that kind from the same place at the same time. Secondly, as I remarked earlier, only a thing of a persisting kind can exercise a capacity to exclude another thing from the place it occupies, so that the exclusion principle for portions of matter itself presupposes an account of the diachronic identity-conditions of portions of matter (their persistence-conditions) and hence an account of their synchronic identity-conditions too: thus it cannot itself constitute an account of those latter conditions.

So, even if we do accept the answer now being contemplated to the

question of what it is that confers the power of mutual place-exclusion upon material objects like tomatoes, we must clearly give up the thought that that power is what *ultimately* underpins the synchronic identity or diversity of such material objects. Moreover, to address the problem of persistence for things like tomatoes by simply taking for granted the persistence of matter is effectively to abandon the property instantiation approach as a general solution to the problem of persistence. I should add, however, that in fact I do *not* think that we ought to accept the answer now being contemplated in any case, because I am not convinced that a quite non-specific exclusion principle for *matter in general* is easily defensible. (It might be easier to defend for the hypothetical homogeneous stuffs discussed in Chapter 3, but is less so for matter as we find it constituted in this, the actual world, where it is ultimately composed of subatomic 'particles' capable of existing in states of quantum superposition.) But then it becomes clearer than ever that mutual exclusion principles for specific *kinds* of material objects—including tomatoes—must have the status of derivative truths relying for their appeal at least partially upon a prior grasp of the specific identity criteria appropriate to objects of the kinds in question.[151]

To sum up my main objection to the property instantiation approach, then, it seems to me that this approach to the diachronic identity of a persisting object such as a tomato tacitly presupposes the very phenomenon which it purports to account for, because its talk of 'tomatohood' being 'instantiated' at a sequence of place-times can only be understood in terms of an *individual persisting tomato* being located at the places and times in question, and this presupposes that we already understand what it is for an individual tomato to persist through time.

3. The Temporal Parts Approach

Having, I hope, exhausted for the time being the dubious attractions of the property instantiation approach, let us turn next to the *temporal parts approach*. (Later on I shall develop a further argument inimical to both of these approaches.) This second approach differs from the first chiefly only

[151] The point may be highlighted by the familiar examples of cases in which, very plausibly, we *should* say that two distinct material objects exist in precisely the same place at the same time—for instance, a bronze statue and the lump of bronze of which it is made. What I would emphasize is that such spatiotemporal coincidence is possible precisely *because* statues and lumps of bronze have *different criteria of identity* —for this confirms that the direction of explanation runs *from* criteria of identity *to* exclusion (or non-exclusion) principles, rather than vice versa.

in replacing talk of the (full and singular) instantiation of tomatohood at a certain place and time by talk of the existence at a place and time of a temporal *part,* or *stage,* or *slice* of a tomato. A diachronic identity criterion for tomatoes will then be framed in terms of spatiotemporal-cum-causal conditions on sets or sequences of such temporal parts. This approach has an apparent advantage over the previous one in that the temporal parts of tomatoes, whatever exactly they may be, plainly cannot just be the same sorts of things as *tomatoes* themselves—and hence there is no immediate threat of circularity to attempts to frame a diachronic identity criterion for tomatoes in terms which invoke such entities.[152] Whereas talk of the (full and singular) instantiation of tomatohood at a certain place and time was transparently just an oblique way of speaking of the existence at that place and time of *exactly one whole tomato,* talk of the existence at a certain place and time of a temporal part or stage of a tomato is not so obviously a merely verbal ploy.

But in a less direct way the temporal parts approach does indeed appear to be viciously circular. For how are the 'temporal parts' of tomatoes (assuming indeed that we countenance the existence of such entities at all) to be individuated and identified save by reference to the very tomatoes of which they are parts? The expression 'temporal part of a tomato' is a theoretical term of art, unlike the term 'tomato' itself, so that it is not open to one just to leave the question of their individuation to 'common sense' or 'intuition'.[153] It will be helpful at this point to compare the notion of a *temporal* part of a tomato with that of one of its *spatial* parts, which is a good deal more familiar (remembering here that it was in terms of just such a comparison that we eventually settled upon an interpretation of the term 'temporal part' for the purposes of Chapter 4). Now, the phrase

[152] Some philosophers do, I concede, believe that a temporal part of an object of the sort *F* may (particularly if the part has quite an extended duration) itself qualify as an object of the sort *F* : see e.g. Anthony Quinton, *The Nature of Things* (London: Routledge & Kegan Paul, 1973), 70. But I can see no advantage for them in this, and only the disadvantage of having to face the threat of immediate circularity which may otherwise be avoided.

[153] In his second postscript to 'Survival and Identity', David Lewis writes: 'A person-stage is a physical object, just as a person is . . . It does many of the same things that a person does: it talks and walks and thinks . . . It even has a temporal duration. But only a brief one, for it does not last long' (p. 76). He then goes on to argue that person-stages thus conceived do indeed exist and constitute the temporal parts of persons. The first step in his argument is this: 'First: it is possible that a person-stage might exist. Suppose it to appear out of thin air, then vanish again' (p. 76). But, I would contend, all that Lewis has really succeeded in doing here is to introduce us to the fanciful notion of a *very short-lived person* (i.e. to the idea that a person might in some miraculous way be conjured into and out of existence in a trice), and as such he has failed to introduce us to a category of independently individuable entities in terms of which a criterion of diachronic identity for persons might be non-circularly specified.

'spatial part of a tomato' is obviously ambiguous as it stands. On the one hand it may be taken to mean 'part (i.e. component or constituent) of a tomato which has spatial characteristics'—under which interpretation one of a tomato's seeds, say, will count amongst its 'spatial parts'. But on the other hand it may be taken to mean something like 'object consisting at any time of the matter enclosed by a geometrically defined surface not extending beyond the outer skin of a tomato'—under which interpretation a quarter-inch cross-section through the middle of a tomato will count amongst its 'spatial parts'. However, it seems evident that the notion of a *temporal* part of a tomato, if it is to play any distinctive theoretical role in an account of the persistence of something like a tomato, can only be supposed to be modelled on the *second* of these two senses of 'spatial part': a temporal part of a tomato has—if, indeed, this is possible—to be thought of as a temporal 'cross-section' or 'slice' of a tomato. For if by a 'temporal part' of a tomato one merely meant, by analogy with the first sense of 'spatial part', a constituent of a tomato which has temporal characteristics, then a tomato's spatial and temporal parts in these senses would be precisely the same sorts of items (items such as its seeds). But—unfortunately for the temporal parts theorist—it seems clear that it is only the spatial and temporal parts of a tomato in this rather jejune *first* sense which qualify as objects that are individuable and identifiable independently of the tomatoes of which they are parts.

Against this claim, it may be perhaps urged that if we are presented with a single spatial slice (or 'spatial cross-section') of a tomato on a plate, then we can individuate and identify this slice without being in any position to say from which tomato it has been cut. But this objection trades on an ambiguity in the notion of a spatial 'slice' (or 'cross-section'). By a spatial 'slice' of a tomato one may either mean a particular type of spatial part of a tomato in the second sense explained above, or else one may mean something like 'object obtained by actually cutting twice through a tomato in two approximately parallel planes'. The spatial parts of a tomato in our second sense of 'spatial part' do *not* include slices of it in this second sense of 'slice', however. There is no possibility of *identifying* slices of the two different kinds—*geometrical* slices and *physical* slices, as we might respectively call them. To see this we only have to consider the different capacities which the two kinds of slice possess to undergo certain sorts of temporal change. For instance, a physical slice of a tomato can clearly undergo all manner of changes in shape, whereas the very nature of a geometrical slice is *defined* in part by its shape. (In the case of a physical slice, shape only enters into the explanation of how the slice is *produced*.) Again, if the material contents of a tomato are rearranged, the matter contained in one of its geometrical slices may well alter considerably

(as various seeds, quantities of juice, and so on alter their locations within the tomato). No comparable possibilities for changing its constituent material arise in the case of the physical slice, however. But these and related facts also serve to show that geometrical slices, unlike physical ones, cannot be individuated independently of the whole objects of which they are slices: thus a geometrical slice of a tomato is partly individuated by reference to its relative *position* within the tomato, which it evidently cannot alter. Moreover, it is clearly *geometrical* slices rather than physical ones which must provide the spatial analogue for the supposed *temporal* parts or 'slices' of persisting objects (since, quite apart from anything else, nothing very obviously corresponds in the temporal case to the physical act of *cutting* which creates a physical *spatial* slice).

Now, if I am right in saying that the spatial parts of a tomato in our second sense of 'spatial part' are objects which cannot be individuated or identified without reference to the tomato of which they are parts, and am also right in supposing that the notion of a *temporal* part of a tomato can only (at best) be seen as analogous to this second sense of 'spatial part', then it would seem to follow that even if we do countenance such entities as the temporal parts of tomatoes, they will not be fit items in terms of which to attempt to frame a non-circular criterion of diachronic identity for tomatoes.[154] In reply to this it might perhaps be urged that the notion of a temporal part of a tomato (or, at least, the notion of an *instantaneous* temporal part of a tomato) only presupposes a *synchronic* identity criterion for tomatoes and hence that it *can* be invoked non-circularly for the

[154] By now some readers may have wanted to accuse me of taking too narrow a view of the temporal parts approach, and in particular too narrow a view of what a temporal part or stage would have to *be*. Thus Sydney Shoemaker, a prominent adherent of the approach, has written: 'Person-stages can be thought of as "temporal slices", not of persons, but of the histories or careers of persons. [Or] one might think of a momentary stage as a set of property instantiations . . . Or one can think of a momentary stage as an ordered pair consisting of a thing and a time' ('Personal Identity: A Materialist's Account', in Sydney Shoemaker and Richard Swinburne, *Personal Identity* (Oxford: Blackwell, 1984), 75). However, the second of these suggestions would reduce the temporal parts approach to the property instantiation approach, while the first and third would transparently make the individuation of 'stages' parasitic upon that of the persisting objects whose diachronic identity they were invoked to account for. Such circularity does not, it is true, worry Shoemaker, who elsewhere concedes that by his own account the persistence-conditions of continuants cannot be non-circularly specified (see 'Identity, Properties, and Causality', in Sydney Shoemaker, *Identity, Cause, and Mind* (Cambridge: Cambridge University Press, 1984)). But I cannot agree that a circular specification of persistence-conditions, however non-trivial, may legitimately be presented as an account of what persistence *consists in*. (Colin McGinn also makes this point in his review of *Identity, Cause, and Mind* in the *Journal of Philosophy*, 84 (1987), 227–32.) So my answer to the objection raised in this note is that I adopt the interpretation of the temporal parts approach which I do because it seems to me to be the least unpromising on this score.

purposes of a diachronic criterion. But again I would reply, as I did when a similar move was made on behalf of the property instantiation approach, that one is not entitled to presume that synchronic and diachronic identity criteria for objects like tomatoes are independently intelligible. The temporal parts approach *seemed* initially to have an advantage over the property instantiation approach precisely on this score: but what we have now seen is that in reality the two approaches are in the same boat—and it is a sinking one. (In case, however, there are any lingering doubts concerning the circularity issue, I should remark that we shall return to it in Chapter 7 below.)

4. The Substantial Constituents Approach

I turn thirdly to the final approach to diachronic identity that I shall consider—the substantial constituents approach, which I myself favour. (A more detailed elaboration of this approach will be found in later chapters, especially Chapter 7 and Chapter 9; for the time being I mean only to give a quick sketch of the approach with a view to exploring its implications.) According to this approach, then, what underpins the persistence of something like a tomato is, quite simply, the persistence of its component parts—and by these I mean its 'spatial parts' in our *first* sense of the term (that is, things such as the seeds and skin of a tomato). Thus, to a first approximation, we may say that, according to the substantial constituents approach, the tomato now sitting on the table is the same tomato as the one which was sitting there five minutes ago if and only if the latter tomato consists of the same component parts as the former and those component parts have, throughout the five-minute period, continued to be related to one another in the way that is characteristic of such parts when they together compose a tomato. Actually, of course, this is slightly to oversimplify matters for a number of reasons. The least important of these is that what has just been said does not cater for the (at best remote) possibility that something like a tomato might be able to undergo an intermittent existence. I shall assume that this possibility, if it is genuine, can be accommodated by requiring the later component parts of a tomato to be suitably causally related to its earlier component parts. A much more important deficiency, however, is that we haven't yet allowed for the fact that something like a tomato can undergo a certain amount of *change* in the identity of its component parts without loss of its own identity (that is, without itself ceasing to be). This is especially obvious during the time in which a tomato is still growing. None the less, at any given time at which it exists, a tomato must *have* component parts of certain characteristic

kinds—skin, seeds, pulp, quantities of juice, and so forth—and it is only in virtue of the persistence from moment to moment of a sufficient proportion of such component parts that the tomato as a whole manages to persist.

A further slight complication is that, as I presently want to interpret the term 'component part of a tomato', certain objects which are materially included in a tomato will not qualify as being amongst its component parts, although they will qualify as standing to the tomato in the *ancestral* of the component-parthood relation—that is, they will be component parts of component parts . . . of component parts of a tomato. Thus an electron in an atom in a molecule in . . . in a cell in a seed of a tomato will not qualify as a component part *of a tomato* in the sense I now intend. My reason for making this proviso is that I want to use the term 'component part of an *F*' (where *F*s are objects of a certain kind) in a way which makes it legitimate to regard the sensitivity of an individual *F*'s identity to changes amongst its component parts as being a largely *conceptual* matter. Clearly, it cannot be a largely conceptual matter whether changes amongst the electrons materially included in a tomato have a bearing on its diachronic identity, whereas it is very much a conceptual matter that changes amongst a tomato's grosser constituents—for example, its seeds, skin, and pulp—have such a bearing. Thus, everyone who understands the term 'tomato' understands that if one were simply to remove all the seeds, skin, and pulp of a tomato, one would no longer be left with a tomato; whereas it is very far from being the case that everyone who understands that term understands that if one were to remove all the electrons in a tomato, one would no longer be left with a tomato. And this is why I want to distinguish the seeds, skin, and pulp, but not the electrons, as being, in the presently intended sense, 'component parts' of the tomato. (That this makes the component-parthood relation, as here understood, *non-transitive* is not something that we should be worried about: we can readily acknowledge weaker notions of parthood which respect transitivity.)

It is important to observe, incidentally, that precisely because the component parts of something like a tomato are objects all of which can be individuated and identified independently of the tomato of which they are parts, the substantial constituents approach to the diachronic identity of persisting objects does not run into the kind of circularity problem which afflicts the temporal parts approach. For, clearly, although it is a largely conceptual matter that a tomato must have objects such as seeds and skin amongst its component parts, so that the latter objects are necessarily conceived of as items apt to compose tomatoes, none the less a particular tomato seed or piece of tomato skin can certainly be individuated and identified without reference to any tomato which it may currently help to

compose: for, quite apart from anything else, such a seed or piece of skin can continue to exist on its own even after ceasing to be part of any tomato.

Now it is evident that the substantial constituents approach cannot—and does not even purport to—offer an exhaustive account of the persistence of substances: it only offers a *schema* for an account of the persistence of any composite substance in terms of the persistence of its component parts. I say a 'schema' because the approach does not presume to be able to tell us, in advance of empirical scientific inquiry and theory-construction, just what the relevant 'component parts' at any point in the hierarchy of composition will be, for substances of any specified kind *F*. In this respect the approach is utterly different from the previous two approaches, both of which are thoroughly aprioristic in character. A clear consequence of the substantial constituents approach, however, is its commitment to the existence of *ungrounded identities* at the base of the hierarchy of composition—and on this issue the approach does take an a priori stance. *Some* thing or things—be it primitive *hyle* or quarks—must simply *persist,* without more ado, and in this all higher-level material persistence must ultimately be grounded.

Here it may be feared that our third approach's combination of empirical and a priori claims renders it particularly vulnerable. For who is to say that physical science will not in due course reveal a way to account for the persistence of so-called 'fundamental' particles in terms of spatiotemporal-cum-causal relations between *non*-persistent entities of some sort—not, indeed, concocted pseudo-entities such as instantaneous 'time-slices', but something the postulation of whose existence would be empirically well-motivated? Certainly, in the *present* state of physical science, the substantial constituents approach may look to be vindicated; for the fundamental (and thus non-composite) particles of modern physics are distinguishable into those that are and those that are not 'stable'—and the 'half-life' of such a particle (infinite in the case of a stable particle like the electron) is apparently taken to be an essential property of that particle which (like its charge and its rest-mass) is not further explicable. But perhaps this is just a parochial feature of contemporary physical theory?

In fact, I do not think that our third approach's commitment to ungrounded identities at the base of the hierarchy of composition is as vulnerable to the future developments of theoretical physics as it might appear to be. What undoubtedly is an empirical issue open to future revision is the correctness of our contemporary theory of matter.[155] What is

[155] It is worth emphasizing that the substantial constituents approach does not demand that the ultimate constitution of material things be *particulate* in nature, as contemporary physical theory would suggest it is (making due allowance, of course, for the wave/particle duality of quantum phenomena). Thus the approach can readily allow, for instance, that at its most fundamental level physical reality might have to be described by means of a vocabulary of *mass* nouns rather than by one of *count* nouns.

not, I think, so vulnerable is some broad notion of matter as the ultimate and itself ungrounded ground of all physical persistence. My reason for thinking this is, as I indicated at the beginning of the chapter, that I believe that the very concept of *time* cannot be divorced from such a notion of matter (or at least from the concept of *something* which persists primitively). For time, I consider, necessarily involves change. And a change can only occur if there is something which persists through that change. But to deny that there is anything whose persistence is ungrounded is to imply that *everything's* persistence ultimately depends upon a succession of changes, which conflicts with the stated dependency of change upon the existence of something persisting through change. Thus expressed, the argument is no doubt suspiciously abstract and condensed; but I shall try in the next section to spell it out in more convincing detail.

5. An Argument for Primitive Persistence

The first premiss of our argument is that time necessarily involves change—by which I mean that time necessarily involves *happenings* or *events*.[156] I do not want to imply by this that there could not be time in a universe which was qualitatively indistinguishable from one moment to the next (nor, though, do I particularly wish to defend the suggestion that there *could* be time in such a universe). All I am saying is that it is partly constitutive of the notion of time that every period of time should contain events or happenings, and that events or happenings are to be understood as *changes*. Nor do I want to insist, here, that all changes are necessarily changes *to* something or *in* something which persists (even though I am sympathetic to that view, as I made clear in Chapter 4): that

[156] In 'Time without Change' (reprinted in his *Identity, Cause, and Mind*), Shoemaker argues that at least in some logically possible worlds it could be reasonable to hypothesize that a period of time had elapsed during which nothing whatever had changed in any way. I am not persuaded by his argument, though I cannot discuss it here. But, in any case, it is clear that the argument cannot be construed as establishing that time might pass in the absence of *any change whatever* without presupposing that the persistence of objects in such a world would *not* be grounded in spatiotemporal-cum-causal conditions on sequences of momentary entities (such as durationless 'time-slices'), since the continual comings-to-be and ceasings-to-be of such entities would precisely constitute *changes* during the supposedly changeless period of time (even though no *qualitative* change need be involved in such a case). So Shoemaker's argument, even if it is correct, cannot be used to any effect against me by adherents of the views of persistence which I am attacking, at least as far as my first premiss is concerned.

would be too easy a way to try to secure our desired conclusion. For present purposes, we can characterize the nature of change by saying that whenever a change occurs, something begins to be the case which was previously not the case—for instance, it begins to be the case that a light is glowing or that there is noise in a certain room.[157] Change in this sense could conceivably still occur even in a qualitatively unvarying universe—for it might begin to be the case, say, that something was yellow where previously *something else* qualitatively indistinguishable was yellow.[158] (Whether this really is possible depends on whether the relevant version of the principle of the identity of indiscernibles is valid—an issue which I shall not go into here.)

The second premiss of our argument is that a change can only occur if there is something which persists through that change. Again, it is not being urged that a change must be understood as a change *in* or *to* something which remains the same throughout that change. For it is at least arguable that some events are not changes *in* or *to* things at all. All that is being urged is that when something begins to be the case which was previously not the case (that is, when a change occurs), there must exist at the time of the change something which also existed prior to the change. For suppose on the contrary that *nothing* existing at the time of the change existed prior to the change: that would of course imply that *everything* in existence at the time of the supposed change had begun to exist at that very time. However, what is it to say this, but to say that the time in question was the beginning of the universe and hence the beginning of time itself? (I am assuming, I hope fairly uncontroversially, that time would not exist in an empty universe.) But the beginning of time cannot be the time of any *change* in our sense, since we cannot truthfully speak of anything's beginning to be the case then *which was previously not the case*.[159] Hence we have reduced our original supposition to absurdity.

No doubt this reasoning may appear sophistical on first sight, but I

[157] It is customary when discussing change to distinguish between 'real changes' and 'mere Cambridge changes': e.g. between Socrates's dying and Xanthippe's becoming a widow. But since the latter sort of change is apparently parasitic upon the former (in the sense that the latter sort of change can only occur provided the former sort does), it is not crucial to my argument to restrict the sense of change it invokes to that of 'real' change—nor, hence, is it crucial for me to tackle the difficult issue of defining the precise difference between the two sorts of change.

[158] Thus consider a universe containing just two balls, one yellow and the other red but otherwise qualitatively indistinguishable from one another: and then suppose that at a certain moment the yellow ball turns red while the red ball turns yellow (and nothing else changes). It seems that the states of such a universe before and after the change would differ only in respect of the identities of the ball which was red and the ball which was yellow.

[159] This means that if we want to call the beginning of the universe an *event,* we had better make this an exception to the rule that events are *changes.*

believe that deeper examination will vindicate it. Suppose I tell you that *nothing* that has existed between now and five minutes ago existed more than five minutes ago: what *can* you make of this but that I am saying that the entire universe began to exist five minutes ago? The earth, the sun, the stars—all these and everything else existing now or in the past five minutes began to exist, I tell you, no earlier than five minutes ago: how could you accept this and yet still give credence to the thought that there were events occurring *more* than five minutes ago? *Ex hypothesi,* no record of any such events could possibly now exist. So what would warrant our talking of these supposed events as *having occurred* more than five minutes ago rather than talking of them as belonging (at best) to an altogether different space-time continuum—another 'possible world'?

But perhaps you will dispute the suggestion that no record of these supposedly earlier events could now exist—urging that this trades on an ambiguity in the term 'record'. A record may either be an *object* bearing a trace of some earlier event, or it may just be an *effect* of some earlier event (in short, it may be what I have just called a 'trace'). But, you may contend, it is only in the *first* sense of 'record' that records of the supposed events could not exist in our hypothesized case: there might still be *states* of presently existing objects which could be attributed to *causes* which occurred more than five minutes ago. However, it seems to me that to argue in this fashion is to beg the very question at issue. Our question is what reason we could have, in the hypothesized case, to suppose that any events might have occurred more than five minutes ago: it is no answer to say that we *could* attribute various states of presently existing objects to causes which occurred more than five minutes ago without explaining with what justification we could suppose causal relationships to be *capable* of reaching more than five minutes into the past. After all, the putative causes of these present states would themselves be events in the very category under dispute. Furthermore, I find it very difficult to see how any such justification *could* be forthcoming: for how could the required causal influences have been propagated in the absence of any objects surviving from the supposed earlier time into the current five-minute period? No photons, for instance, transmitted from objects existing in the supposed earlier period could be received by us—for all existing photons, being persisting things themselves, would *ex hypothesi* have existed for no longer than five minutes.

It shouldn't be thought, incidentally, that my reasoning in this matter is motivated by a crude verificationism: the point is not that, in the hypothesized case, the predicate 'occurred more than five minutes ago' would be devoid of meaning because no empirical evidence could warrant its application. On the contrary, I am presupposing that the predicate *would* be

meaningful in the hypothesized case, while contending on metaphysical grounds that nothing could *made its application true* in that case. After all, what I am urging is that, in the hypothesized case, the statement 'Some event occurred more than five minutes ago' would, of metaphysical necessity, be *false*—not that it would be 'meaningless'. And the reason why it would be false is that in that case the universe itself—which, after all, would be one of the things presently existing—would have come into existence only five minutes ago and with it time itself.

The third premiss of our argument is that if there were *nothing* whose persistence was ungrounded, then *everything's* persistence would ultimately have to depend upon a succession of (suitably interrelated) changes. This may demonstrated with the aid of the two rival approaches to persistence discussed earlier—the property instantiation approach and the temporal parts approach—both of which contend that there is nothing whose persistence is ungrounded. According to both of these approaches, the persistence of any object is to be regarded as consisting in the obtaining of certain spatiotemporal-cum-causal relations between *non*-persisting entities of some sort. According to the first approach, the non-persisting entities in question are momentary instantiations of appropriate properties at certain place-times. According to the second approach, they are momentary 'time-slices' of persisting objects. However, this means that both approaches must regard the persistence of any object as depending upon a succession of changes. On the temporal parts approach this is quite evident, since each of the supposed time-slices of a persisting object has to *come into being* and each such coming-to-be constitutes a *change* necessary for the continued persistence of the object in question. But it is equally evident on the property instantiation approach too. For—taking a tomato again as our example of a persisting object—this approach must presume that tomatohood is freshly instantiated at each moment in the history of a single tomato: and each such fresh instantiation once more clearly constitutes a *change* necessary for the continued persistence of the tomato in question. (For an adherent of the property-instantiation to deny that tomatohood need be freshly instantiated at each moment in the history of a tomato would be tantamount to an admission that tomatoes *simply persist*—ungroundedly—at least through some periods of time.)

So, the three premisses of our argument are as follows: (1) time necessarily involves change, (2) a change can only occur if there is something which persists through that change, and (3) if there were nothing whose persistence was ungrounded, then everything's persistence would have to depend upon a succession of changes. From (1) and (2) we can infer that (4) time can only exist if there is something which persists through time.

(This is obviously not to say that any *one* thing must persist throughout the *whole* of time, just that there can be no period of time during which no persisting object exists.) But, also, from (2) we can infer that (5) if anything persists through time, then there is something whose persistence does *not* depend upon a succession of changes. For if *everything's* persistence depended upon a succession of changes, there would be nothing whose persistence *through* change could render those changes possible in the way required by (2). (I shall return to this claim in the next section, where I shall defend it against a certain objection.) Then, from (5) and (3) we can infer that (6) if anything persists through time, then there is something whose persistence is ungrounded. Finally, from (4) and (6) we can infer that (7) time can only exist if there is something whose persistence is ungrounded. And this completes our argument.

6. An Objection and a Reply

Commenting on an earlier version of the foregoing argument, Harold Noonan writes as follows:

> I agree with Lowe . . . that the hypothesis of a global existence-change is incoherent: if a possible world is one in which there is change it is also one in which there are persisting things . . . which provide the background to change. But to say this is only to say that the applicability of the notion of change to a possible world entails the applicability of the notion of persistence, and that, as far as I can see, is quite compatible with the four-dimensional scheme . . . What does follow, if [this scheme] is correct, is that whenever anything persists, *something else* ceases to exist, and *something else* comes into existence. But that is not to say that *really* nothing persists . . .
> Thus I fail to see that this argument of Lowe's establishes its conclusion.[160]

By 'the four-dimensional scheme', Noonan means the kind of approach to the problem of persistence which I am attacking, particularly as embodied in the temporal parts approach. And, in effect, what Noonan is challenging is my inference of (5) from (2) in the argument as laid out at the end of the previous section. That is, he is denying that it follows from (2)—that a change can only occur if there is something which persists through that change—that (5) if anything persists through time, then there is something whose persistence does not depend upon a succession of changes.

[160] Harold Noonan, 'Substance, Identity and Time', *Proceedings of the Aristotelian Society*, supp. vol. 62 (1988), 79–100: see pp. 99–100.

In reply I offer the following considerations, which draw entirely upon the materials of my original argument. I begin by asking this question: could there be a changing world in which there existed just a *single* persisting object, call it O_1—for instance, a single material atom? What must the 'four-dimensionalist' say about this, in the light of my argument? According to Noonan's construal of the implications of my argument, the four-dimensionalist can happily concede the possibility: for the world in question is, *ex hypothesi,* a changing world—and so, provided that some of these changes are of the kind required to constitute, according to the four-dimensionalist's theory, the persistence of a single object O_1, it follows that the world is one in which the notions of both change and persistence are applicable and thus is one which satisfies the only constraint which, according to Noonan, my argument imposes. Yet, on the contrary, it seems clear from my argument that the four-dimensionalist *cannot* allow for the possibility of the changing world in question (a fact which, in itself, is severely damaging for his theory, since that possibility seems to be a genuine one). He cannot allow it for the following reason.

A change, I have argued (and Noonan has accepted), can only occur at a time *t* provided that something existing at *t* also existed prior to *t* and hence persisted for a period of time up to *t*. (By 'persistence up to *t*', I mean here and henceforth persistence up to *and including t*.) Consider, then, what is required for the occurrence at *t* of the sort of change which, according the four-dimensionalist's theory, would make for the persistence up to *t* of the object O_1. Clearly, such a change can only occur—and hence O_1 can only persist up to *t* according to his theory—provided that *some object,* O_2, *persists up to t*. Moreover, O_2 evidently cannot simply be identified with O_1 itself, since it is merely trivially true that O_1 can only persist up to *t* provided that O_1 itself persists up to *t*—whereas the constraint which my argument imposes is *not* a trivial one. Hence, if O_1 is to persist up to *t* according to the four-dimensionalist's theory, some object O_2*distinct from* O_1 must persist up to *t*. So O_1 could not be the only persisting object. Moreover, it is easy to see that if the four-dimensionalist attempts to account for the persistence of O_2 up to *t* in the same sort of way in which he would account for that of O_1, then he must recognize the existence of *yet another* persisting object, O_3. The only way to terminate this potentially infinite regress is to allow that *some* objects can persist *other than* through the occurrence of changes (contrary to the four-dimensionalist's theory). Moreover, the regress, if unchecked, is clearly a *vicious* one: the four-dimensionalist can take no refuge in the thought that he is merely committed to every possible changing world containing an infinity of persisting objects (though that in itself would be an unpalatable enough commitment). Without a terminus to the regress, *nothing can*

persist at all—and so nothing can change, with the consequence that time itself cannot exist.

Is it open to the four-dimensionalist to concede that O_1 and O_2 must be distinct but to contend that O_3 may be identified with either O_1 or O_2 (so that no more than two persisting objects need exist)? No, it is not. For if the possibility of O_1 persisting up to *t* rests upon O_2 persisting up to *t* and the possibility of O_2 persisting up to *t* in turn rests upon O_1 persisting up to *t,* then neither possibility can be grounded. Something must *actually* persist up to *t* in order for any change to be *possible* at *t* and hence in order for it to be possible for *either* O_1 *or* O_2 to persist up to *t* in the way in which the four-dimensionalist conceives of them as persisting (namely, through the successive occurrence of changes). I conclude, then, that Noonan's objection is unfounded and that my argument emerges unscathed. However, as we shall see in Chapter 7, this is not the only argument that may be advanced in favour of the existence of primitively persisting objects.

7. Lewis on Perdurance Versus Endurance

David Lewis has recently presented a new argument to the conclusion that things which persist through change must do so in virtue of possessing successive temporal parts.[161] Let us first recall that, in Lewis's terminology, 'something *perdures* iff it persists by having different temporal parts, or stages, at different times, though no one part of it is wholly present at more than one time; whereas it *endures* iff it persists by being wholly present at more than one time'.[162] In these terms, then, his conclusion is that ordinary changeable things such as people and puddles (his examples) *perdure* rather than *endure*. This, of course, is a conclusion which I very much want to resist. I should say, though, that in seeking to resist Lewis's conclusion, I do not mean to endorse the suggestion that things such as people and puddles do in fact *endure,* as Lewis understands this word. This is because I can find no very useful application for the notion of such a thing's being 'wholly present' at a time, any more than I can for that of its being 'partially absent' (in the sense, of course, of having earlier or later temporal parts). Certainly, I don't find talk of a thing's being 'wholly present' at any time at which it exists an especially perspicuous way of denying that it possesses temporal parts. All I am concerned to do, then, is to resist Lewis's conclusion that changeable things persist by 'perduring'.

[161] See David Lewis, *On the Plurality of Worlds,* 202 ff.

[162] Ibid. 202.

Lewis's argument turns on what he calls the 'problem of temporary intrinsics':

> Persisting things change their intrinsic properties. For instance shape: when I sit, I have a bent shape; when I stand, I have a straightened shape. Both shapes are temporary intrinsic properties; I have them only some of the time. How is such change possible?[163]

Lewis says that he knows of only three possible solutions. The first is to deny that shapes are genuine intrinsic properties, saying instead that they are 'disguised relations, which an enduring thing may bear to times'.[164] I can agree with Lewis that this solution is untenable. The second is to say that 'the only intrinsic properties of a thing are those it has at the present moment',[165] the implication being a denial of the reality of both the past and the future. Again I can agree that this solution is untenable. Lewis's third solution is the one he favours: 'the different shapes . . . belong to different things',[166] these different things being precisely different *temporal parts* of the changeable, persisting thing, which therefore *perdures* rather than endures. Thus one temporal part of Lewis has a bent shape, another a straightened shape.

However, these three candidate solutions do not exhaust the field. There is another candidate which, in my view, squares far better with common sense than any so far mentioned. To simplify its presentation, I shall consider first not the changing shape of a *person,* but rather the changing shape of a rather simpler object, *O,* consisting of two flat, rigid wooden planks P_1 and P_2 joined endwise by a hinge. At one time *O* may have a bent shape and at another it may have a straightened shape, just as Lewis says of himself. How is this possible? The answer is quite obvious: at one time P_1 and P_2 are at an angle to one another and at another they are in alignment. *O*'s changing *shape* is to be explained in terms of the changing spatial *relations* between its constituent parts, P_1 and P_2, whose own shapes (we have been assuming) are unchanging. *O*'s shape at any given time is *not,* then, a relation (not, in particular, a 'disguised' temporal relation), but it does 'supervene' upon the shapes and spatial relations of its constituents at that time. And as it is with *O,* so it is more complicatedly with more complex objects like human bodies.

This explanation of *O*'s changing shape presupposed, it is true, that P_1 and P_2 were rigid, so that *their* shapes were unchanging. But there is no reason why we shouldn't allow them too to change in shape, explaining this in turn in terms of the shapes and relations of *their* constituent parts.

[163] Ibid. 203–4.

[164] Ibid. 204.

[165] Ibid.

[166] Ibid.

(And notice that when I speak here of 'parts' of changeable objects, I mean this in the ordinary, common-sense way in which P_1 and P_2 are *parts* of *O*; I am not speaking of 'temporal' parts.) Now, obviously, we have set out here upon a regress—but it isn't at all obvious that it must be a vicious infinite regress. The regress can perfectly well be terminated at a level of *fundamental particles,* which have all their intrinsic properties *unchangeably.* Classical atoms had their *shape* unchangeably. The fundamental particles of modern physics—quarks and so on—don't, of course, have shapes at all, in any literal sense, though they do have other intrinsic properties (such as spin, charge, and 'colour') unchangeably. And ultimately, or so we are led to believe, it is in terms of such properties of such particles, together with the relations of such particles to one another, that the whole macroscopic physical realm is to be explained.[167] In short: modern physics offers us a solution to the problem of intrinsic change which renders superfluous Lewis's solution in terms of temporal parts. And in fact, of course, what this solution really appeals to is precisely the approach to the problem of persistence which I advocated earlier in this chapter: the substantial constituents approach.

8. Further Reflections on the Problem of Intrinsic Change

In a reply to an earlier version of the foregoing criticism, David Lewis concludes by saying that 'Lowe has not offered any fourth solution, satisfactory or otherwise, to the problem of . . . intrinsic change. Rather, he has changed the subject'.[168] However, what needs, I think, to be made clear at this point is that there are in fact two distinct, albeit related, problems of intrinsic change: a *semantic* problem and a *metaphysical* problem. Furthermore, I believe that Lewis's favoured solution (in terms of temporal parts) fails not least because it attempts to cope with both problems at once, for this helps to make it a bad solution to each of them. It is a bad solution to the semantic problem because (and Lewis himself expressly recognizes this difficulty) it locates surprising ontological commitments in our common-sense talk about persistence through change. But equally it is a bad solution to the metaphysical problem, not least because it is one

[167] Lewis himself accepts, interestingly enough, that fundamental particles may well 'have no accidental intrinsic properties': see *On the Plurality of Worlds,* 205, n. 6. And if all of their intrinsic properties are essential to them, clearly they can have no temporary intrinsic properties.

[168] David Lewis, 'Rearrangement of Particles: Reply to Lowe', *Analysis,* 48 (1988), 65–72: see p. 72. The reply is to my 'Lewis on Perdurance versus Endurance'.

partly driven by extraneous semantic concerns. These extraneous concerns also blind Lewis, I believe, to the superior merits of the sort of scientifically motivated solution to the metaphysical problem that I defended in the previous section. In the remainder of this section I shall deal first with the semantic problem of intrinsic change and then return to the metaphysical problem.

The *semantic* problem of intrinsic change is the problem of specifying the logical form of sentences ascribing temporary intrinsic properties to persisting objects, in such a way that we do not run into contradiction in describing such an object as undergoing a change from possessing one such property to possessing another incompatible one.[169] The problem may be seen as one of parsing a sentence of the unregimented form '*a* is *F* at t_1' in such a way that it is clearly compatible with one of the form '*a* is *G* at t_2', even though '*F*' and '*G*' should express mutually incompatible intrinsic properties (as do 'straight' and 'bent'). Three solutions immediately suggest themselves. (These do not correspond exactly to Lewis's original three candidate solutions: the first and third correspond to his first and third, but the second corresponds to a solution mentioned in the first footnote of Lewis's reply.) We may parse '*a* is *F* at *t*' either as (i) '*a* is *F*-at-*t*' (so that what is really being ascribed to *a* is, say, a shape-at-a-time—a kind of *relational* property), or as (ii) '*a* is-at-*t* *F*' (so that the ascription of a shape to *a* is *temporally qualified,* that is, the property-exemplification relation between *a* and a shape is relativized to a time), or finally as (iii) '*a*-at-*t* is *F*' (so that a shape is ascribed to a *temporal part* of *a*—Lewis's favoured solution).

It seems to me that if we have to accept one or other of these three solutions to the semantic problem of intrinsic change, then we had better opt for solution (ii), as this is clearly the least revisionary with respect to our common-sense talk of persistence through change. Solution (i) is revisionary about predicates and solution (iii) is revisionary about subjects, but solution (ii) retains '*a*' and '*F*' as subject and predicate respectively and takes 'at *t*' at its face value as having *adverbial* (or predicate modifier) status. I think it is tendentious for Lewis to describe solution (ii) as merely being a 'variant' of solution (i), as I shall explain more fully in a moment. Nor am I persuaded by his reasons for finding solution (ii) problematical. On the latter score, he asks 'what does standing in some [temporally relativized] relation to straightness have to do with just plain being

[169] Lewis is no doubt right in implying that an analogous problem arises for what he calls intrinsic *relations* : but since the solution I defend below can be extended to deal with them, I shall for simplicity restrict my discussion to intrinsic *properties*.

straight?'.[170] But what does Lewis understand by 'just plain being straight'? And why does he attach such importance to the notion—why *should* there be anything to do with 'just plain being straight'? I can only suppose that this phrase is supposed to denote some *atemporal* mode of property exemplification (such as that enjoyed, perhaps, by abstract geometrical figures). But in that case, why can't we just happily deny that changeable, persisting physical objects can *ever* correctly be described as 'just plain being straight'? It transpires, of course, that Lewis himself is committed to denying this too, since he holds that a changeable, persisting thing is only ever describable as 'being straight' in the derivative sense of having one or more straight temporal parts. But, given that Lewis and I can *agree* that a changeable, persisting thing is never describable as 'just plain being straight', what is it that compels one to accept his account of this fact, couched as it is in terms of entities that allegedly are so describable? Is it that the notion of 'just plain being straight' is supposed to have some sort of epistemic priority for us—that we have to learn first what it is for the temporal parts of things to 'just plain be straight' before we can get to grips with the more complicated situation with changeable, persisting things? That can hardly be so, given mankind's general ignorance of the very existence of these supposed temporal parts until a very few years ago! Surely it is on the contrary much more plausible to see the notion of 'just plain being straight' (if we really need it at all) merely as an abstraction from our temporal experience of the variable geometry of changeable, persisting things. Here I note that in criticism of solution (i) (and by implication of solution (ii) also) Lewis says that it 'has wrongly done away with shapes as intrinsic properties that can be had *simpliciter*'[171]—even though it appears that by his own account the only (physical) things that *can* 'have shapes *simpliciter*' are *temporal parts,* since he concedes that changeable, persisting things cannot. But then I ask: given the widespread ignorance of the very existence of temporal parts, whence comes the supposed intuition that shapes are 'properties that can be had *simpliciter*'?

Lewis says of solution (ii) that 'it still amounts to a denial that things have temporary intrinsics'.[172] But I don't see this. The shapes and so on that things are by this account said to have are still treated as genuine *non-relational* properties, and only the *having* of them is related to a time—but, then, isn't that precisely what allows them to be *temporary* properties? Describing solution (ii), Lewis says 'It puts the relationality not in the

[170] 'Rearrangement of Particles: Reply to Lowe', 66 n. 1. As we shall shortly see, the words that I have interpolated here are not ones that Lewis would have chosen, but this is because, in my view, he significantly misinterprets solution (ii).

[171] Ibid. 66.

[172] Ibid. 66 n. 1.

shapes themselves but in the having of them'[173]—and this is correct—but then he goes on to give the following gloss on this: 'there is a *three-place relation of instantiation* [holding between objects, properties and times].'[174] This gloss is, however, unacceptable. To say that the *having* (instantiating or exemplifying) of a shape is related to a time is to say that the holding of a *two*-place relation is related to a time, not that a *three*-place relation is involved, one of whose relata is a time. Lewis's gloss exhibits a failure to take seriously the adverbial (or predicate modifier) status which 'at *t*' has according to solution (ii). Hence he is wrong to assert that this solution 'still claims that to be shaped is to stand in relations to other things, *inter alia* to times'.[175] For what it in fact claims is that a thing's *being shaped* itself stands in relations to times, not that a thing's being shaped is partly a matter of *that thing's* standing in relations to times. Thus an adherent of solution (ii) will want to say, in explanation of the consistency of saying that an object *a* is bent at time t_1 and straight at time t_2, that this amounts to saying that *a*'s having a bent shape *obtains at* t_1 while *a*'s having a straight shape *obtains at* t_2.

Although one should exercise caution in drawing analogies between space and time, the following spatial analogy may be deemed illuminating. The analogy concerns the problem of what we might call '*local* intrinsics'. Consider the sentence 'The Thames is broad in London', which we plainly want to see as compatible with one like 'The Thames is narrow in the Cotswolds', even though 'broad' and 'narrow' express incompatible intrinsic properties. Again three ways of parsing our first sentence suggest themselves: (i) 'The Thames is broad-in-London' (ascribing to the Thames the relational property of broadness-in-London), (ii) 'The Thames is-in-London broad' (modifying the ascription of broadness to the Thames by an adverb of place which specifies *where* along its length the Thames is broad), and (iii) 'The Thames-in-London is broad' (ascribing broadness to a spatial segment of the Thames). And again I would urge the superiority of solution (ii)—at least as an analysis of what one would normally be taken to *mean* by the original sentence. Someone uttering that sentence would *not,* I submit, normally be taken to be ascribing the esoteric relational property of broadness-in-London to the Thames, nor, however, to be ascribing broadness only to a spatial segment of the Thames rather than to the Thames itself. For observe here that verifying the sentence 'The Thames is broad in London' requires one only to individuate a certain *river* (the Thames) and a certain *place* (London)—and then to do some measuring of that river in that place. One is *not* required to individuate and then measure a certain *spatial segment of a river* (the Thames-in-London)—indeed,

[173] Ibid.

[174] Ibid, emphasis added.

[175] Ibid.

one can be quite innocent of the thought that such entities as river-segments even exist. Where our analogy breaks down, of course, is in the fact that while it is philosophically uncontroversial to claim that spatially extended objects such as rivers do indeed *have* spatial parts—even if the common man may not be in the habit of individuating them—it is by no means uncontroversial to claim that persisting objects do indeed have *temporal* parts. But then this makes it all the more significant that even in the spatial case solution (iii) can and should be resisted, since if it should be resisted where the claim about parts is uncontroversial, then all the more should it be resisted where the claim is not uncontroversial—for not to resist it here is, as Lewis realizes, to embroil the semantics of common-sense talk in metaphysical controversy.

Let me now return to the *metaphysical* problem of intrinsic change. This, as I see it, is the problem of how there can *be* objects for the description of which the semantic problem even arises—that is, how there can exist objects of such a kind that we need to be able to say, without fear of contradicting ourselves, that *one and the same* such object may undergo a change from possessing one intrinsic property to possessing another incompatible one. My proposed answer—which, of course, appeals to the substantial constituents approach—is that the identity over time of certain objects consists in the preservation of certain relationships between the constituent or component parts which those objects possess at any given time. Thus the identity over time of a ship consists (roughly speaking) in the maintenance of certain structural relationships between the objects which constitute its component planks and spars at any given time; and the identity over time of a tree consists (again, roughly speaking) in the preservation of certain functional biological relationships between the objects which constitute its component roots, trunk, branches, leaves, and so forth at any given time. And the reason why this view of the diachronic identity of such objects provides an answer to the metaphysical problem of intrinsic change is that it can explain how, consistently with a tree (say) being numerically *one and the same tree* at times t_1 and t_2, that tree may none the less differ in respect of *some* of its properties at the two times: it can differ in this way because *its* continuing identity is consistent with a degree of replacement and/or rearrangement *amongst its components,* sufficient to allow for growth and maturation and so forth.[176] Thus one and

[176] Lewis is right in imputing to me a denial that an object such as a human being or a tree is to be *identified* with its components at any given time—'Composition as identity is not for [Lowe]' (p. 71). But as far as the *metaphysical* problem of intrinsic change is concerned, this denial by no means condemns my solution to irrelevancy, as Lewis alleges. For my solution shows how changes in an object's intrinsic properties may supervene upon replacements and/or rearrangements amongst its components. However, I should concede at this point that, while I think that the substantial constituents approach does provides one possible solution to the metaphysical problem of intrinsic change, I do not think that it is *essential* to that approach that it should regard all objects which persist primitively—the ultimate constituents of things—as having only permanent intrinsic properties (even if current physical theory suggests that this is so). But, of course, if primitively persisting objects *should* prove capable of possessing temporary intrinsic properties, this will not be explicable in the way I have proposed for composite objects such as ships and trees. Some other solution will have to be devised in that case.

the same tree may at one time be small and slender and at another tall and stout. And, of course, the same sort of story may be told about one of the components of a tree, such as a leaf, in terms of *its* components—though, as I explained in the previous section, there is no reason to regard this regress as vicious, since it may be terminated at the level of fundamental particles.[177]

Now Lewis also has an answer to the metaphysical problem of intrinsic change: and indeed it is effectively the same as his answer to the semantic problem—though he, of course, does not perceive the two problems as being genuinely distinct.[178] For him the identity over time of a tree consists in the obtaining of certain relationships between its supposed *temporal parts or stages*—relationships which are consistent with these temporal parts differing from one another in respect of at least *some* of their properties, such as their size and shape. Thus, for Lewis, the reason why there can be such a thing as a tree which changes from being small and slender to being tall and stout is that such a thing actually *consists* of a series of temporal parts or stages, one of which may be small and slender and another tall and stout. However, as a solution to the metaphysical problem this involves the quite gratuitous invocation of a category of entities hitherto unknown to layman and scientist alike—the supposed 'temporal parts' of persisting objects. I say 'gratuitous' because we already have to hand the solution which I outlined a moment ago—a solution only invoking entities either already familiar to the common man (things like the component roots and leaves of a tree) or else, as we proceed steadily towards microstructure, discoverable by science (things like cells and molecules and atoms). It is true enough that this solution is not also a solution to the *semantic* problem of intrinsic change and indeed presupposes

[177] I might remark here that my view of diachronic identity is not one which Lewis's picturesque circle diagrams are well suited to illustrate—which may help to explain his evident puzzlement at my position.

[178] More accurately, perhaps, he thinks that there is only a single problem and perceives it as being primarily a metaphysical one—certainly, the opening paragraph of his reply to me reads as the articulation of such a position. That Lewis sees 'the' problem as basically metaphysical also helps to explain his dismissive attitude towards solution (ii) described above—for this solution to the *semantic* problem manifestly leaves the metaphysical problem quite untouched (though I, of course, see this as a virtue rather than a defect).

such a solution. At bottom it is this, I think, that Lewis finds unsatisfactory about my metaphysical solution as presented in my original article. But then, as I have tried to make clear, the solution to the metaphysical problem has no business to be masquerading as a solution to the semantic problem, and so it is by no means to the credit of Lewis's own solution that it addresses both problems at once. The correct solution to the semantic problem (admittedly not tackled in my original article) is, I submit, solution (ii) described above.

6 Substance and Dependence

In the previous chapter we saw how the existence of time—and more particularly the temporal unity of the world as *one* world existing in time—is dependent upon the existence of concrete individual substances persisting through time, with the consequence that persisting substances cannot coherently be conceived to be mere sequences or aggregates of successively existing momentary entities (temporal parts or 'time-slices'). But so far we have been working with an undefined and merely intuitive conception of a concrete individual substance as a 'continuant', a qualified 'thing' capable of surviving changes in its qualities and relations and thereby participating in various events. At this point, then, a more precise characterization—and if possible an exact definition—of substance is called for, especially since that notion has further important work to do in later chapters of this book. We need to be quite clear as to how substances differ both from properties or qualities and from events, as well as how entities of these respective categories are related ontologically to one another. (Other items we need to accommodate within the picture are individual places and times.) In short, we need to supplement the high-level categorial distinction between abstract and concrete objects, discussed in Chapter 2, with a more detailed categorial framework at a lower level. That will be part of the task of the present chapter, one that will be continued in the following two chapters. However, I believe that a necessary prerequisite for success in this task is the articulation of an adequate notion of *ontological dependency,* since it is in terms of such a notion that the ontological relationships between substances and entities of various other categories need to be explained. Accordingly, explicating such a notion (or, rather, a family of such notions) will be the main aim of this chapter.

1. Substances, Properties, and Ontological Dependency

Clearly, a crucial notion in metaphysics is that of one object *depending for its existence upon* another object—not in a merely causal sense, but in a

deeper, ontological sense. (The kind of dependency in question must also be distinguished from any kind of *logical* dependency, because logical relations, strictly speaking, can only obtain between propositions, not between concrete objects, nor between abstract objects which are not propositional in nature.) Thus a *substance* is often conceived to be an object which does not depend for its existence upon anything else.[179] Again, *properties* are often said to depend for their existence upon the objects which possess them.[180] So how should this relationship of existential dependency be defined? An obvious proposal would be to say, quite simply:

(D1) x depends for its existence upon $y =_{df}$ Necessarily, x exists only if y exists.

The *definiens* here is equivalent, of course, to 'Necessarily, if x exists, then y exists', so that according to (D1) the existential dependency of x upon y amounts to the strict implication of y's existence by x's existence. Note that (D1) implies that everything depends for its existence upon *itself*—but, while the desirability of this implication may be disputed, I shall let the matter pass for the time being and return to it later. (It would, of course, be easy enough to modify (D1)'s *definiens* to read 'y is not identical with x and, necessarily, x exists only if y exists', but that would have the disadvantage of *precluding* anything from depending for its existence upon itself.)

On the face of it, (D1) seems to capture precisely the intuitive notion of existential dependency. For example, when it is said that a particular event, such as the assassination of Caesar, depends for its existence upon Caesar, (D1) seems to explicate this appropriately in terms of the fact that the assassination could not have existed if Caesar had not existed to be assassinated. Some *other* assassination could have existed at that very time and place, but for that very assassination to have existed, Caesar himself had to exist. Incidentally, I speak here and later of events *existing,* whereas ordinary usage prefers talk of their *occurring*: but I think that this is a matter of idiom rather than one of genuine ontological import. I am inclined to take the view that to say that x exists is just to say that there is

[179] Thus Descartes, in the *Principles of Philosophy* (I. 51), asserts that 'by *substance* we can understand nothing other than a thing which exists in such a way as to depend on no other thing for its existence'. See *The Philosophical Writings of Descartes,* ed. John Cottingham *et al.* (Cambridge: Cambridge University Press, 1985), i. 210.

[180] Thus Descartes, once again, remarks in the *Second Set of Replies* (Definition V) that 'we know by the natural light that a real attribute cannot belong to nothing'. See *The Philosophical Writings of Descartes,* ii. 114.

something that is identical with *x*: and this applies as much to events as to entities of other ontological categories. (Note, however, that this does not restrict existence to entities possessing fully determinate identity-conditions—what I called 'individual objects' in Chapter 3—provided one is prepared to say, as I am, that any entity whatever must at least be *self*-identical. Incidentally, in what follows, I shall often use the term 'object' rather less precisely than I did in Chapter 3, understanding it to extend to what I there called 'quasi-objects' and 'quasi-individuals'. More precision than this is not called for at present.)

But how well does the conception of substance adverted to earlier fare under the assumption of (D1)? According to that conception, a substance may be defined as follows:

(D2) *x* is a substance $=_{df}$ There is nothing *y* such that *y* is not identical with *x* and *x* depends for its existence upon *y*.

Substituting the *definiens* of (D1) into (D2) gives the theorem:

(T1) *x* is a substance if and only if there is nothing *y* such that *y* is not identical with *x* and, necessarily, *x* exists only if *y* exists.

But presumably we want to allow that substances may be *composite* objects, that is, that they may possess proper parts: and yet isn't it the case that any composite object is such that, necessarily, it exists only if its proper parts exist? So are we not compelled to give up either (D1) or (D2)? Perhaps not, for we may instead deny that a composite *substance* depends for its existence upon its proper parts, on the grounds that it may undergo a change of its parts without ceasing to exist. It may be true that a mere *collection* of things, such as a pile of stones, depends for its existence upon the things in question, but for that very reason such a collection may be deemed not to be a true substance. By contrast, a living organism may survive a change in any of its parts (provided the change is effected in a non-disruptive manner). It is true, of course, that such an organism must *have* parts if it is to exist, but *which* objects those parts are is inessential—and consequently it is not the case that it depends for its existence (in the sense defined by (D1)) upon any one of those parts. (We shall see later, however, that it is possible to define *another* sense of existential dependency in which it *is* true to say that a composite substance depends for its existence upon its proper parts: see (D1g) below.)

Let us now, for the time being, leave the notion of substance and turn to that of *property*. Earlier it was pointed out that properties are commonly said to depend for their existence upon the objects which possess them. We may state this in the form of an axiom, as follows:

(A1) If *x* is a property and *y* is an object possessing *x,* then *x* depends for its existence upon y.

This time, substituting the *definiens* of (D1) into (A1) gives us:

(T2) If *x* is a property and *y* is an object possessing *x,* then, necessarily, *x* exists only if *y* exists.

But (T2) might also be challenged. For even if one subscribes to an 'Aristotelian' (as opposed to a 'Platonic') view of universals, according to which there can be no unexemplified properties (that is, no properties not possessed by objects),[181] one may still contend that a given property, *x,* possessed by a particular object, *y,* would exist even if *y* did not, provided that some *other* object then possessed *x*. However, to this challenge it might be replied that it misconceives how (T2) is to be interpreted: (T2), it may be said, is not intended to apply to properties understood as *universals,* but only to so-called *particularized properties* (otherwise variously known as property instances, individual accidents, tropes, or—my own preferred term—modes). These are supposed items such as the particular redness of a particular apple, conceived of as an entity distinct from the redness of any other apple, no matter how well matched in colour to the first.[182] On this interpretation, (T2) has considerable plausibility, complying as it does with the intuition that particularized properties cannot 'migrate' from one object to another. (Actually, (T2) itself does not quite imply this, though it does imply that a particularized property cannot migrate from one object to another when the first object ceases to exist.)

But now another difficulty looms. What, in the light of our preceding remarks, are we to say about the ontological status of properties in the sense of *universals*? More specifically, do they qualify as *substances* according to the proposed definitions? For, even adopting the 'Aristotelian' view, whereby if a property *x* exists then *some* object must exist which exemplifies *x,* we are not compelled to say that there is any object *y,* exemplifying *x,* such that necessarily, *x* exists only if *y* exists. However, even if the universal *x* does not depend for its existence upon

[181] Such a view of universals is defended by David Armstrong in *Universals and Scientific Realism* (Cambridge: Cambridge University Press, 1978).

[182] See e.g. Keith Campbell, *Abstract Particulars* (Oxford: Blackwell, 1990), in which these items are called (following D. C. Williams) 'tropes'. Described as 'moments' (following Husserl), the existence of such items is ably defended by Kevin Mulligan, Peter Simons, and Barry Smith in 'Truth-Makers', *Philosophy and Phenomenological Research,* 44 (1984), 287–321. For an illuminating discussion of Husserl's conception of moments as 'dependent parts', see Peter Simons, 'The Formalisation of Husserl's Theory of Wholes and Parts', in Barry Smith, ed., *Parts and Moments: Studies in Logic and Formal Ontology* (Munich: Philosophia Verlag, 1982).

any of the objects which exemplify it, perhaps it still depends for its existence upon something else and thereby fails to qualify as a substance. Yet there is a difficulty in seeing what sort of entity, quite generally, could be invoked to fulfil this role. *Compound* universals (such as conjunctive ones, and disjunctive ones if they exist) no doubt depend for their existence upon the universals out of which they are compounded. Likewise, if one believes that *determinable* universals exist in addition to determinate ones (for instance, red in addition to scarlet and crimson), one may argue that the determinate universals depend for their existence upon the determinable ones.[183] (The reverse would be more difficult to argue for, because it is presumably *not* the case, for instance, that necessarily if red exists then scarlet exists—since it is possible for red to be exemplified, and so to exist, even if scarlet is not exemplified. Incidentally, one should, of course, concede that scarlet itself is only a determinable relative to a more specific shade of it, so that more accurately one should speak of a scale of determinateness from most to least.) However, simple and least determinate universals would not appear to depend for their existence upon any other universals—unless perhaps it can be argued that corresponding to any universal there is a higher-order universal which must exist if that first universal does (for example, that if the property of being red exists, then so must the property of being a colour-property).[184]

Suppose, then, that we *cannot* exclude (all) universals from the category of substance according to (D2) in conjunction with (D1): what to do? A plausible move, which would not appear unduly *ad hoc,* would be simply to modify the definition of substance, (D2), to give:

(D2*) x is a substance $=_{df}$ x is a particular and there is no particular y such that y is not identical with x and x depends for its existence upon y.

After all, we have the respected precedent of Aristotle, who (in the *Categories*) only admitted particulars as 'primary' substances, while allowing some universals (the species and genera of primary substances) the status of 'secondary' substances.

[183] Armstrong denies the existence of determinable universals: see *Universals and Scientific Realism,* ii. 118. There he also denies the existence of disjunctive universals, but accepts conjunctive ones.

[184] An argument of this sort is advanced by Gary Rosenkrantz and Joshua Hoffman in 'The Independence Criterion of Substance', *Philosophy and Phenomenological Research,* 51 (1991), 835–52: see p. 845. See also their *Substance Among Other Categories* (Cambridge: Cambridge University Press, 1994), 97–8.

An alternative strategy that I should mention would be this. We could first define a 'generic' notion of existential dependency as follows:

(D1g) x depends for its existence upon objects of type T = $_{df}$ Necessarily, x exists only if something y exists such that y is of type T.

In this sense, both composite substances and 'Aristotelian' universals are existentially dependent objects, since the former require the existence of proper parts and the latter require the existence of particular exemplars. (Set T as 'proper part of x' and 'particular exemplar of x', respectively, in (D1g).) We could then define a *substance* as an entity which is existentially dependent *only* in virtue of requiring the existence of parts (bearing in mind here that even a non-composite substance must have *itself* as a part, albeit as an improper part):

(D2g) x is a substance = $_{df}x$ only depends for its existence upon objects which are parts of x.

(If we believe in the existence of universals, then we should clearly add to the *definiens* 'and universals which are exemplified by x'.) This will then exclude universals from the category of substance because their particular exemplars—upon which they depend for their existence, in the sense defined by (D1g)—are not parts of them. However, I shall not pursue this alternative strategy further here since the problems that we shall later discover to afflict (D2*) also afflict this alternative definition of substance. Moreover, this alternative definition has additional problems of its own: for instance, unless we are prepared to regard particularized properties as *parts* of the objects possessing them (which looks like a category mistake), or else to argue against their existence altogether, then we shall have to conclude that only 'bare particulars—propertyless substrata—could qualify as substances. Similarly, unless we are prepared to regard *places* as parts of the objects occupying them, or again to deny their existence altogether, we shall have to conclude that only unlocated mental entities—immaterial souls, perhaps—could qualify as substances. (These problems could, no doubt, be evaded by adding appropriate clauses to (D2g), but because the terms introduced by those clauses—such as 'particularized property' and 'place'—express concepts no *more* fundamental than that of substance itself, the resulting definition of substance would be philosophically unilluminating, even if extensionally correct. We shall encounter the same type of problem with another rival to (D2*) later: see the discussion of (D2**) below.)

2. The Problem of Essential Properties and Events

An apparently more serious problem for (D1) and (D2) than that posed by universals is this. How can we accommodate the possibility that some, at least, of the particularized properties of a substance (assuming such particularized properties to exist) are *essential* to it? For if *y* is an essential particularized property of a substance *x,* it will apparently be the case that there is something non-identical with *x,* namely *y,* such that, necessarily, *x* exists only if *y* exists: and this conflicts with *x*'s status as a substance according to (D2)—and indeed according to (D2*) as well, since *y* in this case is a particular. (A similar problem would arise if composite substances could have *essential* proper parts, but perhaps this can more plausibly be denied than that they have essential properties; I am certainly no adherent of the doctrine of mereological essentialism, though those who are seem disinclined to regard composites as substances anyway.)[185]

Now, what could be a plausible example of an essential particularized property of an individual substance, say Socrates? Recall that particularized properties are conceived of as property *instances,* such as the particular redness of a certain apple. Of course, an apple can change its colour, so that this is not an example of an *essential* particularized property of the apple. But what about—in the case of Socrates—his *humanity* (as it were, his particular *being human*)? Certainly, if there is such a thing as the particular humanity of Socrates, he cannot lose it without ceasing to exist. But perhaps we can deny that this particularized humanity is anything distinct from *Socrates himself*: after all, its existence necessarily coincides with his. (We already know, by (A1), that it depends for its existence upon him, and given now that it is essential to him it follows that the existential dependency between them is mutual.) In short, perhaps we can argue that the distinction, such as it is, between Socrates and his humanity is merely a 'distinction of reason'. It is not obvious that this strategy will run into conflict with Leibniz's law even if the strategy is extended to *all* the essential particularized properties of a substance—for, precisely because the notion of an essential particularized property is a somewhat arcane one, it does not appear that we can cite uncontentious examples of predicates true of such a property but false of the substance possessing it, or vice versa. Nor does any problem arise from identifying *both* Socrates' humanity *and* his animality, say, with Socrates himself, despite these particularized properties being instances of different universals, for this

[185] See further Roderick Chisholm, *Person and Object: A Metaphysical Study* (London: George Allen & Unwin, 1976).

entirely parallels the fact that Socrates himself is an instance both of human-kind and of animal-kind—indeed, 'parallels' is too weak a term on the present view, since on this view these two ways of talking reflect only a distinction of reason. (I shall say more about this view in Chapter 9.)

I am inclined to endorse the strategy just outlined: that is, to maintain that if indeed there are such things as essential particularized properties that are 'possessed' by substances, then they are in fact to be *identified* with those substances, whence they constitute no threat to the theorem (T1) derived from definitions (D1) and (D2). Yet I don't think we are entitled to go further and maintain quite generally that wherever items *x* and *y* are mutually existentially dependent as defined by (D1), they are identical. For although too little is independently known about essential particularized properties to dispute an identity between them and the substances possessing them, other cases are more problematic. For instance, consider the relationship between Socrates and the temporally extended event or process that was *his life*. Clearly, in terms of (D1), Socrates' life depends for its existence upon Socrates—but so, plausibly, does his existence upon it. And yet there are things true of the life of Socrates that are not true of him and vice versa (for example, that it was so many years long, and that he weighed so many pounds)—so there is no question of their being identical. But perhaps it will be disputed whether Socrates is existentially dependent upon his life—whether *he* necessarily would not have existed if *it* had not—for it may be urged that he might have had or led a *different* life. Now, it is true enough that his life might have been *qualitatively* different in many ways, but what is now at issue is whether he might have had a *numerically* different life—and it is hard to see how he could. For we have accepted that *lives* depend for their existence upon the persons whose lives they are: that is to say, necessarily, *x*'s life exists only if *x* exists. So suppose, for the sake of argument, that Socrates could have had a numerically different life: then it would still have been a life which could only have been Socrates'—no one other than Socrates could have had that 'other' life. But then what could underpin the supposition that it is indeed a life 'other' than the life he actually had (except qualitatively)? Other possible worlds clearly do contain lives that do not exist in the actual world, in so far as they contain *people* who do not exist in the actual world: but there seems to be no reason to suppose that they do so other than for that reason.

If this judgement is correct, however, then we do after all have a problem with our original definition of substance (D2), in so far as it and (D1) entail (T1)—a problem, moreover, which equally afflicts our revised definition of substance (D2*). For Socrates is a substance and yet, contrary to (T1), there is something (a particular), not identical with Socrates—his life—such

that, necessarily, if Socrates exists then this other thing exists. (I should perhaps emphasize that I am only interested in the life example as a potential threat to (D2) and (D2*), so that not too much hinges on my assessment of it provided alternative examples could replace it.) Now, an obvious expedient here would be simply to modify our definition of substance yet again so as to exclude *events* (including processes), to give:

(D2**) x is a substance $=_{df}$ x is a particular non-event and there is no particular non-event y such that y is not identical with x and x depends for its existence upon y.

Again, this seems reasonable and not unduly *ad hoc,* in as much as it incorporates the strong pre-theoretical intuition that substances are *continuants* rather than *events*. However, a disadvantage of this approach is that it precludes us from *defining* events as non-substances, on pain of circularity. Indeed, we are now under some pressure to *provide* a definition of 'event', since this category is certainly no *more* fundamental than that of substance itself and so cannot be taken as primitive in an adequate definition of substance.[186] Unfortunately, however, it is quite plausible to hold that events simply *are* changes in the properties and relations of persisting things (continuants), including substances, so we are caught in something of a dilemma. The point is that an attractive strategy is to define the category of continuants as embracing substances and collections of substances (the latter being things like armies and piles of stones) and then to define events and processes as changes or sequences of changes in the properties and relations of continuants: but this patently requires us not to define 'substance' in terms of 'event', as in (D2**).

3. The Asymmetry of Existential Dependency

As it happens, however, I think that there are independent reasons for not adopting (D2**) anyway. More particularly, I think that it is a mistake to respond to the problem raised by Socrates' life by modifying (D2*) in this way, because the real source of the problem lies with (D1), the definition of existential dependency. The case of Socrates' life demonstrates that definition (D1) permits the possibility of mutual existential dependency between non-identical things. But there is something very unsatisfactory about this implication because, I believe, our (primary) intuitive notion of ontological dependency is of a distinctly *asymmetrical* relation (though I

[186] Cf. Rosenkrantz and Hoffman, 'The Independence Criterion of Substance', and *Substance Among Other Categories,* 67–9.

shall shortly modify this claim in a minor way). Take, indeed, the relationship between Socrates and his life. According to (D1), Socrates is quite as much existentially dependent upon his life as his life is upon him. And yet there is a strong intuition that, quite to the contrary, Socrates' life is the truly dependent entity here, while Socrates is a wholly independent existent (a substance). We want to say that Socrates' life only exists *because* Socrates does, whereas it would be putting the cart before the horse to say that Socrates exists *because* his life does. Now, the conjunction 'because' *is* asymmetrical, because it expresses an *explanatory* relationship and explanation is asymmetrical. Two distinct states of affairs cannot *explain each other*. (There *may,* quite conceivably, be *self*-explanatory states of affairs, so I only want to urge that *non-identical* states of affairs cannot be mutually explanatory; technically, this means that I should strictly describe explanation as an 'antisymmetric' rather than as an asymmetric relation—a point to which I shall return, though I shall ignore it for the time being.) The asymmetry of explanation is, of course, intimately related to the unacceptability of circular arguments. (Note here that while two distinct propositions may entail one another—at least according to a reasonably fine-grained criterion for the individuation of propositions—none the less, in so far as those entailments are exploited to argue for the truth of one or other of those propositions, one must make an exclusive choice as to which proposition is to be regarded as premiss and which as conclusion: one cannot have it both ways.)

All this suggests that (D1) should be replaced, at least to a first approximation, by something like:

(D1*) x depends for its existence upon $y =_{df}$ Necessarily, x only exists because y exists.

Here it is important that the presence of the word 'only' in (D1*)'s *definiens* should not be understood as implying that an object x may not depend for its existence upon two (or more) different things, y and z. Thus the particularized relation of Mary's loving Tom—supposing such an entity to exist—plausibly *only exists because Mary exists,* but plausibly also only exists because Tom exists. Furthermore, I am assuming that it is *not* an implication of (D1*) that a composite substance depends for its existence upon its proper parts, that is, that it is *not* the case that it 'only exists because they exist'—on the grounds that it could still exist in the absence of *those* particular parts, provided suitable alternative parts were substituted for them. (Thus (D1*) is quite unlike (D1g) in its implications for part–whole dependency relations, as far as substances are concerned.) For the same reason, I assume that (D1*) does not imply that an 'Aristotelian' universal depends for its existence upon its particular exemplars.

Indeed, I take it that the *definiens* of (D1*) entails the *definiens* of (D1)—though not vice versa, of course—so that the following is a theorem:

(T3) If, necessarily, *x* only exists because *y* exists, then, necessarily, *x* exists only if *y* exists.

However, despite these clarifications, it must be conceded that the locution '*x* only exists because *y* exists' is hardly very perspicuous, either as to its logical form or as to its exact meaning. Moreover, precisely because I have introduced the conjunction 'because' as an *explanatory* conjunction, it may be felt that it is not well-suited to the ontological role now being devised for it. There are perhaps two sources of worry here: first, that this approach invites a confusion between metaphysics and epistemology; and secondly (but relatedly) that contexts governed by the conjunction 'because' are *opaque* (in the technical sense of the term, in which it implies the non-applicability of Leibniz's law).

Although I think that these latter worries can be allayed, I accept that (D1*) as it stands does not constitute anything like a satisfactory definition of existential dependency, conceived as an objective metaphysical relation between entities, because it is insufficiently perspicuous. Even so, the considerations which led us away from (D1) and towards (D1*) may still have served to point us in the right direction. The fact that (T3) but not its converse is plausibly taken to be a theorem indicates that what we need to seek for a satisfactory definition of existential dependency is a perspicuous relation between *x* and *y* stronger than (entailing but not entailed by) 'necessarily, *x* exists only if *y* exists'. This should moreover be (for reasons discussed earlier) an *asymmetrical* relation—or, more accurately, an *antisymmetric* relation, that is, a relation *R* such that if *xRy* and *yRx,* then *x* = *y* (this is to allow that an object may depend for its existence upon *itself,* but that where it depends for its existence upon *something else,* that other thing does *not* in turn depend for its existence upon the first object).

As we shall see in a moment, a relation of just the sort we seek is the relation of *identity-dependence,* to be explained below. But first I should digress for a moment to dismiss the suggestion that the relation we seek might be expressed in terms of the *one-sided* holding of the relation defined in (D1). According to this suggestion, we would have:

(D1+) *x* depends for its existence upon *y* $=_{df}$ (i) necessarily, *x* exists only if *y* exists and (ii) it is not the case that, necessarily, *y* exists only if *x* exists.

Notice that the relation thus defined is asymmetric rather than antisymmetric: it doesn't permit any object to be existentially dependent upon

itself. This alone does not render such a definition unsuitable for deployment in conjunction with a definition of substance along the lines of (D2) and (D2*), though it would render otiose the clause '*y* is not identical with *x*' in those definitions. A much more serious problem is that such a definition does nothing to resolve the difficulty raised by the example of Socrates' life: for it will prevent us from saying that *either* Socrates *or* his life is existentially dependent on the other, since in neither case is clause (ii) of the proposed definition satisfied.

4. Existential Dependency as Identity-Dependence

I spoke a moment ago of the relation of *identity-dependence* as being the sort of relation we seek. What I propose, accordingly, is this:

(D1**) *x* depends for its existence upon *y* $=_{df}$ Necessarily, the identity of *x* depends on the identity of *y*.

To say that the identity of *x* depends on the identity of *y* —or, more briefly, that *x* depends for its identity upon *y*—is to say that *which* thing of its kind *y* is fixes (or at least helps to fix) *which* thing of its kind *x* is. (By 'fixes' in this context I mean *metaphysically determines*—so that, strictly speaking, the word 'necessarily' in (D1**)'s *definiens* is redundant, since identity-dependence is never a contingent relation.) A fully perspicuous *formal* definition of identity-dependence is not easy to frame (for reasons which we shall come to in a moment), but the relation can be made sufficiently clear for most of our present purposes by means of examples. For instance, the identity of a *set* is fixed by the identities of its members and the identity of an *assassination* is (at least partially) fixed by the identity of the person assassinated. These relationships of identity-dependence are direct consequences of the identity criteria governing the kinds of which the items thus related are instances.[187] Thus the identity-dependence of a set upon its members is a direct consequence of the Axiom of Extensionality, which functions as a criterion of identity for sets. Notice, here, that I allow that *x* may be said to depend for its identity upon *y* even in cases in which the identity of *y alone* does not suffice to fix the identity of *x*: thus a set with two or more members depends for its identity upon *each* of them, although its identity is only *completely* fixed by the identities of *all* of them.

Now, although I have not yet offered a formal definition of identity-dependence,

[187] For more on identity-criteria, see Chapter 2 above and also my 'What is a Criterion of Identity?'

it seems to me that a consequence of any such definition should be the following theorem:

(T4) If the identity of *x* depends on the identity of *y*, then, necessarily, there is a function *F* such that *x* is necessarily identical with the *F* of *y*.

For example: because the identity of a marriage depends on the identities of the two people being married, if *x* is a marriage and *y* and *z* are the two people in question, (T4) is satisfied in respect of *x* and *y* in virtue of the fact that *x* is necessarily identical with the marriage of *y* with *z*—so that in this case the required function is the 'marriage with *z*' function from persons to events. (I ignore the complications created by the fact that, under some legal systems, the same two persons may be married to one another more than once.) Note that the purpose of the second occurrence of the word 'necessarily' in (T4) is to ensure that *F* is a function which picks out *x* as the referent of the expression 'the *F* of *y*' in every possible world in which that expression refers to anything at all: thus the event that was actually the marriage of *y* with *z* could not have been anything other than the marriage of *y* with *z*. (By contrast, the 'first marriage' function, for example, does not meet this requirement, because the event that was actually the first marriage of *y*—say, the marriage of *y* with *z*—might not have been the first marriage of *y*, since *y* could have married someone else before marrying *z*.) It seems clear, however, that wherever the identity of an item *x* depends on the identity of another item *y*, the criterion of identity for items of *x*'s kind will supply the requisite function *F*.

Evidently, it would not do simply to replace the conditional connective in (T4) with a *bi*conditional connective and thence attempt to turn it into a *definition* of identity-dependence, unless at the same time one could impose some suitable restriction on the kind of function involved. For—to give a simple example—if we let *y* be *x* (that is, the unit set of *x*), then we see that *x* is necessarily identical with the sole member of *x*: and yet, intuitively, the identity of *x* depends on the identity of *x* rather than vice versa. So the 'sole member' function would obviously have to be excluded. How to exclude all and only the intuitively inappropriate functions is, however, a problem of some magnitude which remains to be resolved. Perhaps the most promising strategy would be to exclude the sole member function on the grounds that, whereas it is part of the 'essence' of *x* that it contains *x* as its sole member, it is *not* part of the 'essence' of *x* that it is the sole member of *x* (because whereas one cannot understand what x is without understanding that it contains *x* as its sole member, one certainly *can* understand what *x* is without understanding that it is the sole member of *x*). And then we could generalize this reasoning so as to

exclude any function F which is not such that it is part of the essence of x that it is the F of y, giving us as our desired definition of identity-dependence the following:

(D3) The identity of x depends on the identity of y $=_{df}$ Necessarily, there is a function F such that it is part of the essence of x that x is the F of y.

We can exemplify (D3) by letting x be z and y be z, in which case we have, as is intuitively correct, that the identity of z depends on the identity of z because, necessarily, there is a function—namely, the 'unit set' function—such that it is part of the essence of z that it is the unit set of z.

Obviously, (D3) entails (T4), since it is necessarily the case that if F is a function such that it is part of the essence of x that x is the F of y, then x is necessarily identical with the F of y —although, as the example of x and its unit set demonstrated, the converse is *not* necessarily the case. That is, it is not necessarily the case that if F is a function such that x is necessarily identical with the F of y, then it is part of the essence of x that x is the F of y: thus, x is necessarily identical with the sole member of x, but (plausibly) it is not *part of the essence of* x that x is the sole member of x.[188]

But, of course, for the foregoing strategy to work and thus for (D3) to be fully vindicated, a perspicuous account of the notion of 'essence' is required—and that is a large task which I shall not try to undertake here.

Before proceeding, there is one minor worry that I should try to forestall, namely, that it cannot be correct to define existential dependency simply *as* identity-dependence—as in (D1**)—because existence and identity are different concepts. My answer is twofold. First, existence and identity are in fact intimately related, via the principle that for an object x to exist is just for there to be something that is identical with x. Second, we shall see in a moment that identity-dependence actually entails the kind of existential dependency defined by (D1): and since the latter relation is certainly an existential one, it surely follows that identity-dependence qualifies as such a relation too. (Later, indeed, I shall suggest a reconciling move, whereby we may call these two relations 'strong' and 'weak' existential dependency respectively.)

In the light of preceding considerations, we need now to establish two consequences of (D1**). First:

[188] Cf. Kit Fine, 'Essence and Modality', in James E. Tomberlin, ed., *Philosophical Perspectives,* 8: *Logic and Language* (Atascadero, Calif.: Ridgeview, 1994), 4–5. See also Kit Fine, 'Ontological Dependence', *Proceedings of the Aristotelian Society,* 95 (1994–5), 269–90, for more on the notion of essence and an account of ontological dependence which is in some ways quite similar to my own.

(T5) If the identity of *x* depends upon the identity of *y,* then, necessarily, *x* exists only if *y* exists.

And second:

(T6) If *x* is not identical with *y* and the identity of *x* depends on the identity of *y,* then the identity of *y* does *not* depend upon the identity of *x*.

These theorems are, I think, relatively easy to prove. As to (T5), clearly, since for *x* to exist is for there to be something identical with *x* (which presupposes that *x* at least has self-identity), *x* cannot exist unless everything upon which *x*'s identity depends also exists. Thus an assassination cannot exist unless the person assassinated exists; and a set cannot exist unless its members exist. (We can demonstrate (T5) more rigorously with the aid of (T4): for if, necessarily, there is a function *F* such that *x* is necessarily identical with the *F* of *y,* then since the *F* of *y* cannot exist unless *y* exists, *x* cannot exist unless *y* exists.) And as to (T6), this follows from the requirement of non-circularity which is a condition on the adequacy of any criterion of identity. (This non-circularity requirement is clearly related to the *explanatory* status of an adequate criterion of identity, so that we have by no means abandoned our earlier thoughts on the role of explanation in an account of existential dependency, but have merely fixed more precisely on what *kind* of explanation is relevant to such a relationship.) For example, given that unit sets are not to be identified with their members, we cannot say *both* that the identity of a unit set depends upon the identity of its member *and* that the identity of that member depends upon the identity of that unit set, for this would engender a vicious circle which would deprive both unit sets and their members of well-defined identity-conditions. But note that this still allows us to say that there may be some privileged kinds of items which possess determinate identity-conditions even though though they are not governed by any adequate (because non-circular) criterion of identity.[189] Such items would depend for their identity *solely upon themselves* (and so, if particulars, would qualify as substances according to (T7) below).

Of course, it might be urged, with some plausibility, that *every* object *x* trivially depends for its identity upon itself—and if that is so, then, according to (D1**), every object *x* likewise depends for its existence upon itself (which was also a consequence, it may be recalled, of our original definition, (D1)). And, certainly, (D3) has this implication, because for any object *x,* it is necessarily the case that there is a function—namely, the identity function—such that it is part of the essence of *x* that *x* is the

[189] See further Chapter 2 above and Chapter 7 below.

object identical with *x*. On the other hand, however, there is something to be said for amending (D3) by making an exception of the identity function, because, for example, it seems odd to say that the unit set of *x* depends for its identity upon itself *in addition to* depending for its identity upon *x*: surely—it might be urged—the identity of *x* is *all* that the identity of that set depends on. But, be this as it may, we must in any case be careful to distinguish between the claim that an object depends for its identity upon itself and the claim that an object depends for its identity *solely* upon itself: even if the former claim is trivially true of all objects, the latter claim is not. (This is important because we do not want our definitions to imply that everything, trivially, is a substance.)

5. The Definition of Substance Revisited

In order to test the adequacy of definition (D1**), we must now assess its compatibility with certain metaphysical views we felt persuaded to endorse earlier on. Our chief concern must be to ask how our revised definition of substance fares in the light of (D1**). This revised definition was:

(D2*) *x* is a substance $=_{df}$ *x* is a particular and there is no particular *y* such that *y* is not identical with *x* and *x* depends for its existence upon *y*.

Substituting the *definiens* of (D1**) into (D2*) enables us to derive:

(T7) *x* is a substance if and only if *x* is a particular and there is no particular *y* such that *y* is not identical with *x* and the identity of *x* depends on the identity of *y*.

Composite substances appear to comply with (T7): for although they possess proper parts, they do not depend for their identity upon those parts, since *which* objects those parts are does not help to determine *which* substances they are parts of (the same objects being capable of becoming parts of many different substances).[190] Moreover, substances quite

[190] I believe that this judgement is perfectly consistent with the possibility—appropriately interpreted—that some composite substances possess *essential* proper parts, though I myself am not convinced that any do. The point is that if *y* is an essential proper part of a composite substance *x*, then while it is true that if *y* ceases to be a proper part of *x*, then *x* must cease to exist, it is still possible for *y* to become an essential proper part of another composite substance *z*, whence the presence of *y* as an essential proper part of a substance has no special bearing on the identity of that substance. Thus the possibility that composite substances possess essential proper parts is not a difficulty for the combination of (D2*) and (D1**), in the way that it is for the combination of (D2*) and (D1). Of course—in the light of (D3)—this means that I must not interpret '*y* is an essential proper part of composite substance *x* ' as implying 'it is part of the essence of *x* that *x* is the whole of which *y* is a proper part'. But, for the reason just given, I would plainly be correct in rejecting such an interpretation, because one must allow that *y* could become a part of wholes other than *x* and hence that it could not be part of the essence of *x* that *x* is *the* (one and only) whole of which *y* is a proper part.

generally do not depend for their identity upon their (accidental) particularized properties (if such exist), nor upon the events in which they participate, nor upon the places they occupy, nor upon other substances. The particularized properties of substances (assuming such properties to have determinate identities) and the events in which substances participate—that is, items such as the particular redness of this apple and the assassination of Caesar—clearly depend for their identity upon those substances, which precludes the reverse relationship from obtaining, on pain of circularity. (The only admissible exception would be in the case of *essential* particularized properties of substances, but these, we have suggested, may be identified with the substances themselves.) As for places, although a physical substance must indeed occupy *some* place, *which* place it occupies does not determine *which* substance it is, since substances may exchange places. Again, substances (such as Socrates or this apple) can, logically, exist in the absence of any other substances (other than their own proper parts, if they are composite), whence they cannot depend for their identity upon other substances (*including* their own proper parts, for reasons already given).

As against this last claim, the thesis of the 'necessity of origin' might be urged against me, implying as it does, for instance, that Socrates is the particular person he is by virtue of being the child of a particular man and a particular woman, or, at least, the product of the union of a particular sperm and a particular egg.[191] My answer is that I reject this thesis, though I shall not argue against it here beyond pointing out the intuitive force of the claim that Socrates—that very person—could, logically, have had *no* beginning to his existence at all, or have come into existence *ex nihilo*. We may agree that Socrates—that very person—could not have been born of different parents without conceding that he had to be born of the particular parents he did have, because we needn't concede that in order to exist he had to be born of parents at all. Likewise, we may agree that no person other than Socrates could have been the product of the particular sperm and egg which produced him, without conceding the crucial point at issue. (I shall go into the matter further in the next chapter.)

I conclude that (T7) is correct in its verdict that substances do not

[191] The *locus classicus* for this thesis is Saul Kripke, *Naming and Necessity* : see 110 ff.

depend for their identity upon anything other than themselves. This is *not* to say that no substance can be governed by an adequate (because non-circular) criterion of identity, however: for *composite* substances can be supplied with such criteria framed in terms of equivalence relations defined over their actual or possible proper parts—and this can be done consistently with denying that the identity of those composite substances is *fixed,* even partially, by the identity of their proper parts, as we shall see more fully in Chapter 7. The point is thus that not *all* criteria of identity determine the existence of relations of identity-dependence for items governed by those criteria, though many do.

It will be recalled that what led us to reject (D1), our original definition of existential dependency, was that it permitted two different objects to be existentially dependent upon one another—objects such as Socrates and Socrates' life. (D1**) precludes such possibilities, as we have seen: indeed, it delivers the intuitively correct verdict that it is Socrates' life which depends for its existence upon Socrates, rather than vice versa. For Socrates' life is an extended event or process in which he participates; and *which* person Socrates is partially determines *which* event this is, but not vice versa. Or, to put it another way, it is part of the essence of Socrates' life that it is the life of Socrates, but it is not part of the essence of Socrates that he is the person who lived that life (contrary to what Leibniz seems to allege). Of course, we can still acknowledge that the relation defined by (D1) does hold mutually between Socrates and his life and we can still call this relationship a type of existential dependency—we might call it 'weak' existential dependency, to distinguish it from the 'strong' variety defined by (D1**). Similarly, we can recognize as other species of existential dependency the 'generic' (weak) existential dependency defined by (D1g) and the 'one-sided' (weak) existential dependency defined by (D1+). My point is simply that, in the sense of existential dependency in which we are intuitively and pre-theoretically inclined to describe substances as existentially independent objects, the relationships defined by (D1), (D1g) and (D1+) will not serve our purposes whereas that defined by (D1**) will. The only plausible sense in which a substance is an entity which does not depend 'ontologically' upon anything other than itself is the sense in which it does not depend for its *identity* upon anything else. Given the intimate relationship between identity and existence, together with the fact that identity-dependence entails 'weak' existential dependency (theorem (T5)), it seems entirely appropriate to regard identity-dependence as constituting the 'strong' species of existential dependency that we seek.

7 Primitive Substances

In this chapter I shall extend my account of the categorial structure of the world, taking the most fundamental ontological distinction of all to be that between *abstract* and *concrete* entities. The distinction between *universals* and *particulars* cuts across this, I consider, because I think that there are both concrete and abstract particulars—though not, I shall contend, concrete universals. As in Chapters 2 and 3, I shall distinguish *objects* as those entities—whether abstract or concrete, universal or particular—which possess fully determinate identity-conditions, but I shall allow that there are, or may be, entities other than objects. In later sections of the chapter, I shall examine in more depth the definition of 'substance' developed in Chapter 6, with a view to establishing more precisely the extension of that term. I shall distinguish substances from various metaphysically interesting kinds of *non*-substances—such as quantities of matter, spatial and temporal parts, events, places, and times. Substances themselves, I shall argue, may be either composite or non-composite, most familiar examples belonging to the former class. I shall explain why a non-composite substance can have no informative criterion of diachronic identity, with the consequence that its identity over time must be 'primitive' or 'ungrounded'. I shall then argue that at least some non-composite or primitive substances must exist if anything concrete at all is to exist (thereby reinforcing the conclusions of Chapter 5) and I shall offer some speculations as to the nature of such primitive substances. The most obvious candidates are, on the one hand, certain sub-atomic particles and, on the other, selves or persons—with the latter having rather stronger credentials than the former, in the light of the difficulties which attend an 'objectual' interpretation of quantum-level phenomena.

1. Abstract Versus Concrete and Universal Versus Particular

All entities may be categorized, at the very highest level of generality, as being either *abstract* or *concrete* and as being either *universal* or *particular*. Each distinction is exhaustive and exclusive. The two distinctions are

not, however, mutually independent, for while particulars may be either abstract or concrete, universals may only be abstract. There are—the doctrines of Hegel notwithstanding—no concrete universals, as I shall explain shortly.

But first I should recall and expand upon some of the claims I made in Chapter 2. Concrete entities differ from abstract entities in being occupants of space and/or time and consequently in possessing spatial and/or temporal properties and relations. That is to say, all and only concrete entities exist either both in space and time or at least in time. Such entities as biological species, which undergo evolution and hence exist in time, do not provide a counterexample to this claim, for these entities are in fact concrete particulars rather than abstract universals. Thus the horse species is a concrete particular which consists, at any time during its history, of the mereological sum of all particular horses existing at that time.[192] Particular horses are (temporary) *parts* of the horse species, but are *instances* of the kind *horse,* this last being an abstract universal and so timeless and unchanging.

Universals differ from particulars in being *instantiable* by entities which are themselves not instantiable—that is, by particulars.[193] Thus the kind *horse* is instantiated by many particular horses, but no particular horse does or can have instances. Horses, of course, are *concrete* particulars. *Abstract* particulars are exemplified by such objects as particular *sets* and, perhaps, particular *numbers*: for instance, the set of all presently existing horses and the cardinal number twenty-seven. (Here I do not challenge the widely held view that numbers are particulars, though I shall eventually reject it in Chapter 10 below.) Such abstract objects, like all particular objects, are necessarily instances of certain kinds. For no objects are 'bare' particulars—things that are particular, but not particular such-and-suches.[194] Thus, most obviously, the two abstract objects just mentioned are instances, respectively, of the kinds *set* and *cardinal number*. These kinds, like all kinds, are again abstract objects—but universals rather than particulars.

As I said a moment ago, there are, I believe, no concrete universals. These, if they existed, would be entities which occupied space and/or time and yet were instantiable and so not particulars. A problem with postulating such entities is that one would expect any particular instance of a supposedly concrete universal to inherit that universal's alleged spatiotemporal

[192] Cf. Hull, 'Are Species Really Individuals?'

[193] See further my *Kinds of Being,* ch. 3, and cf. J. J. E. Gracia, *Individuality: An Essay on the Foundations of Metaphysics* (Albany, N.Y.: State University of New York Press, 1988).

[194] See further my *Kinds of Being,* ch. 2.

properties and relations: and yet it is difficult to see how it could do so compatibly with possessing its own distinctive spatiotemporal properties and relations. For different concrete particulars of the same kind may—and in many cases must—differ in their spatiotemporal properties and relations. Some philosophers, it is true, speak of a universal as being 'wholly present' in each particular which instantiates it,[195] which might seem to imply that a universal has the spatiotemporal location of *every* concrete particular which instantiates it and thereby qualifies as a concrete entity itself. But then the following difficulty seems to arise. Suppose that *P*1 and *P*2 are two different and spatiotemporally separate concrete particulars, both of which instantiate a certain universal *U*: and suppose, as is being suggested, that *U* is 'wholly present' in both *P*1 and *P*2. If *U*'s being 'wholly present' in *P*1 means that *U* is located where *P*1 is and *U*'s being 'wholly present' in *P*2 means that *U* is located where *P*2 is, then it seems that we must say that *P*1 and *P*2 can both be located where *U* is at a certain time even though they are not located where each other is at that time. And this seems utterly mystifying: indeed, on the assumption that '*x* is located where *y* is' expresses an equivalence relation, it is nothing short of a contradiction. So, whatever we make of talk of a universal as being 'wholly present' in its concrete instances, we had better not construe it as implying that that universal is spatiotemporally *located* where they are nor, hence, as giving any succour to the thought that such a universal is a *concrete* entity.

Concrete particulars are exemplified not only by such objects as particular horses, but also by such diverse entities as a particular mass or quantity of water, a particular pile of stones and a particular event (such as the death of a particular horse). All such concrete particulars are—like the abstract particulars mentioned earlier—instances of *kinds*. They also possess various properties or qualities and stand in various relations. Notice that I say that they *possess* properties or qualities, not that they are *instances* of properties or qualities. For properties or qualities—construed as universals—must not be conflated with kinds, at least as I understand the term 'kind'. As I shall explain more fully in Chapter 8, I take kinds to be kinds of *objects*—that is, I take them to be universals which have particular objects as their instances. And although properties or qualities plausibly do have particular instances,[196] I think it is mistaken to categorize such *property instances* as being *objects* in their own right, for reasons explained in Chapter 3. For property instances—'tropes' or, as I prefer to call them, 'modes'—appear to lack the fully determinate identity-conditions

[195] See Armstrong, *Universals: An Opinionated Introduction,* 98–9.

[196] See further Keith Campbell, *Abstract Particulars.*

characteristic of objects proper. So, while I am prepared to acknowledge the existence of particular instances of the properties of redness, heaviness, and sphericity—items such as the particular redness of a certain red apple—I am loath to describe such items as instantiating kinds. Rather, I prefer to say that *objects* of various kinds—such as the kind *apple*—*possess,* or *exemplify,* or are *characterized* by properties such as redness, in virtue of possessing particular instances of those properties. In short, I consider properties or qualities to be essentially *adjectival* rather than *objectual* in nature. (And the same applies to relations—though their instances are, as it were, adjectival upon more than one object.)

Failure to acknowledge the foregoing distinctions leads, in my view, not only to a distorted ontology, but also to an incoherent conception of predication in general as always being expressive of a relation between objects. With Frege,[197] I think we should recognize that predicative expressions, or 'concept'-words, are semantically 'unsaturated' and consequently not object-denoting—even though, as I made clear in Chapter 2, I am not happy with Frege's overall approach to the notion of an object. One place where I part company with Frege is in not regarding kind terms (such as 'horse') as being 'concept'-words. In my view, to say that Dobbin is a horse is indeed to affirm a relation—the relation of instantiation—between two objects, one a particular and the other a kind: though I should emphasize that instantiation is no ordinary relation, any more than is its close relative, identity.[198] By contrast, to say that a certain apple is red is, I believe, merely to characterize a *single* object—a particular—in a certain way: that is, it is to say something about how that object is (in this case, how it is coloured).

All genuine objects, both particulars and universals, possess determinate and non-arbitrary identity-conditions. That, indeed, I take to be the hallmark of objecthood. To adapt Quine's famous slogan (though not the gloss he puts upon it), 'No *object* without identity'.[199] Retaining the terminology of Chapter 2, an informative and non-circular statement of such identity-conditions may then be called a *criterion of identity* for the object in question and others of its kind—though not all objects can be presumed to be governed by such criteria, since some may have identity-conditions which cannot be stated in a non-circular way, as indeed we shall see in due course. But because all concrete objects exist at least

[197] See Gottlob Frege, 'On Concept and Object' [1892], in *Translations from the Philosophical Writings of Gottlob Frege,* and cf. Barry Miller, *From Existence to God* (London: Routledge, 1992), ch. 2.

[198] See further my *Kinds of Being,* ch. 2.

[199] See W. V. Quine, 'Speaking of Objects', in his *Ontological Relativity and Other Essays,* and *Pursuit of Truth* (Cambridge, Mass.: Harvard University Press, 1990), 52.

in time if not also in space, their identity-conditions are necessarily temporal in character, constraining their identity both *at* a time (synchronic identity) and *across* time (diachronic identity)—though the latter, of course, only in the case of persisting objects. By contrast, abstract objects, both universals and particulars, have timeless identity-conditions. Thus the identity-conditions of sets are given by the Axiom of Extensionality of set theory: sets are identical just in case they have the same members. And note again that objects which instantiate the same kinds necessarily possess the same identity-conditions.

So much for preliminaries: now I return to the topic of *substance*.

2. Substance, Dependence, and Particularity

In Chapter 6, a *substance* was defined to be a particular which does not 'strongly' depend for its existence upon anything other than itself, where 'strong' existential dependency was understood in terms of *identity-dependence*. By this account, then, a substance is a particular which does not depend for its identity upon—or 'owe' its identity to—the identity of anything other than itself. As I explained in Chapter 6, I take identity-dependence to be an asymmetrical—or, more precisely, an antisymmetrical—relation. To that I add here one further assumption concerning 'strong' existential dependency, namely, that there cannot be infinite descending chains of objects standing in relations of strong existential dependency to one another: in short, that all real existence must be 'grounded' or 'well-founded'. Such an 'axiom of foundation' is quite probably beyond conclusive proof and yet I find the vertiginous implications of its denial barely comprehensible.

We also saw in Chapter 6 that there are various other species of existential dependency besides this 'strong' variety. For example, there is what I there called 'generic (weak) existential dependency', defined as follows: x generically depends for its existence upon entities of type T =df necessarily, x exists only if something y exists such that y is of type T. (See definition (D1g) of Chapter 6.) The fact that a substance is a 'strongly' existentially independent entity does not prevent it from being 'generically' existentially dependent upon many types of entity. For example, a *composite* substance—one that has proper parts which together compose it—generically depends for its existence upon such parts: necessarily, *it* exists only if there exist things which are proper parts of it, even though the *identity* of that substance does not depend upon the identities of those parts.

I have, of course, made it part of the definition of 'substance' that a substance is a *particular,* which may seem somewhat *ad hoc*. Why, it may be asked, shouldn't a *universal* qualify as a 'substance', so long as it does not depend for its identity upon anything other than itself? I confess that this verdict may indeed appear a little arbitrary if one espouses a 'Platonic' or 'transcendent' realism concerning universals, whereby they exist independently (in the generic sense) of their particular instances because they may lack such instances altogether. But my own preference is for an 'Aristotelian' or 'immanent' realism concerning universals, which asserts on the contrary that a universal can only exist if there are (somewhere and somewhen) particulars that are instances of it. Thus, on this view, a universal is generically existentially dependent upon its particular instances. And then a question which we may raise is this: should the fact that a universal is generically existentially dependent upon its particular instances disqualify it from being a 'substance', when a composite substance is not disqualified from being a substance by the fact that it is generically existentially dependent upon its proper parts? I am inclined to answer 'Yes', for the following reason. First, it must be emphasized that the particular instances of a universal are in no sense *parts* of it. Being neither identical with it nor parts of it, they are wholly distinct from it. By contrast, the proper parts of a composite substance are *not* wholly distinct from it: indeed, they are, in a perfectly good sense, partly identical with it, in that each of them is identical with a part of it. Now, it does not seem contrary to the nature of a substance that it should be generically dependent upon items which are not wholly distinct from itself. But it *does* seem, at first blush, contrary to the nature of a substance that it should be generically dependent upon items which *are* wholly distinct from itself, in the way that a universal (conceived as 'immanent') is generically dependent upon its particular instances.

Here it may be objected that a composite substance is generically dependent upon many types of entity other than its own proper parts. For example, it is generically dependent upon its properties and its spatiotemporal location (the latter, at least, if it is a concrete entity): for it must certainly *have* properties and a location, even though its identity does not depend upon the identities of those properties and that location. However, it might again be urged that the (particular) properties and location of a substance are not wholly distinct from it—not, now, in the sense that they are identical either with it or with parts of it, but rather in the sense that they do not exist 'separately' from it, being on the one hand *ways* it is and on the other hand *where* it is. Whether a response along these lines is ultimately satisfactory is not, however, a matter which I shall attempt to settle here.

Incidentally, I think it is an open question whether there are any *abstract* substances, though any that did exist would have to be abstract *particulars,* given the definition of 'substance' that I have proposed. If the empty set exists, it would appear to qualify as an abstract substance—though I myself think that its existence is doubtful, for reasons to which I shall return in Chapters 10 and 12. Since sets depend for their identity upon the identities of their members, which are distinct from them, no set other than the empty set could qualify as a substance. (Of course, sets, being abstract objects, exist timelessly, even though their members may be concrete and so exist only at certain times: but a timelessly existing set can still depend strongly upon its concrete members, just as a timelessly existing universal can depend generically upon its concrete instances.) As for (cardinal) *numbers,* these—apart, perhaps, from zero—could apparently not qualify as substances, even if they are not reducible to sets: for each number depends for its identity on the identities of the others, because its identity is determined by its position in the number series (as we saw in Chapter 2). All in all, I am inclined to the opinion that there are in fact no abstract substances.

3. Substance and Individuality

If the foregoing conclusions are correct, it follows that all substances are concrete particulars. But not all concrete particulars are necessarily substances—indeed, some are demonstrably not substances. For one thing, I believe that only *individuals* can be substances—and not all particulars are individuals, as we saw in Chapter 3. In line with the view expressed in that chapter, an *individual* may be thought of as an entity which is differentiated from others of its kind in such a way that it and they are apt to constitute a *countable plurality,* each member of such a plurality counting for just *one,* a *unit,* of its kind. An individual, then, must possess an inherent *unity* which makes it a countably distinct instance of its kind.

As I remarked a moment ago, not all particulars are individuals. For example—as we saw in Chapter 3—particular masses or quantities of matter ('parts of stuff', as I called them there) are not. A particular like this—for example, a particular mass or quantity of water—is indefinitely further divisible into other particulars of exactly the same kind (in this case, other particular masses or quantities of water), all of which constitute proper parts of it. Such a particular may be scattered and intermixed with quantities of other kinds of stuff. And yet it appears to possess perfectly determinate identity-conditions. One can quite meaningfully ask whether, for instance, the total mass or quantity of water currently occupying a certain room is numerically identical with the total mass or quantity

of water which occupied that room yesterday. Even so, particular masses or quantities of water do not constitute countably distinct *ones* or *units* of their kind: one cannot intelligibly inquire *how many* particular masses or quantities of water currently occupy a certain room, only *how much* water there is there altogether. This is because, in virtue of their indefinitely further divisibility into other particulars of the same kind, such particulars lack the unity that is definitive of individuality. They are, to coin a term, *dividuals* rather than *in*dividuals.

It should be stressed that the notion of individuality is not, as such, a mereological notion: it would be wrong to suppose, for instance, that an individual must be a whole whose proper parts are 'unified' in a special kind of way, for this would be mistakenly to rule out the possibility of there being non-composite individuals. Rather, the 'unity' that is definitive of individuality is a purely logical notion—the notion of an entity's constituting a *one* of its kind. Even so, it is true that where an individual *is* composite in nature, its individuality will demand an appropriate unification of its proper parts—as, for example, the various parts of an individual animal need to be appropriately organized to form the animal as a whole.

Now, it is clear enough that particular masses or quantities of matter do not qualify as substances because they depend for their identity upon the identities of objects distinct from themselves—namely, their own proper parts. For if any part of the total mass or quantity of water currently occupying a certain room is destroyed and replaced by the same amount of different water, it is clear that the total mass or quantity of water we are left with is numerically distinct from the original, albeit equal *in* quantity. ('Quantity' in the latter sense is used to express a measure of *how much* of a kind of stuff is present in a locality, whereas in the sense used elsewhere in this section it can combine with other expressions to form a definite description referring to a *particular instance* of a kind of stuff.) That is to say, a particular mass or quantity of water cannot survive a change in the numerical identity of its proper parts, and this disqualifies it from being a substance according to my proposed definition.

4. Non-Substantial Concrete Individuals

The next thing we need to be clear about is that not even all concrete *individuals* are substances, according to my definition. In illustration of this fact, I shall consider four quite different categories of concrete individual non-substances: collectives, spatiotemporal parts, events and, lastly, places and times.

A *collective* is an object, such as a pile of stones or a herd of sheep, which is the mereological sum of a number of distinct individuals held together by some relation (which may be spatiotemporal, causal, or socio-legal in nature). The members of the collective—such as the stones in the pile—are literally *parts* of it: which is why a pile of stones (having concrete parts) is itself a concrete object, unlike the abstract particular that is the *set* or *class* of those stones. But collectives are not substances because they depend for their identity upon the identities of their members: if we remove one stone from a pile and replace it with a new one, what remains is strictly and literally a numerically different pile (though for convenience we may indeed more loosely speak of it as being the 'same').

The *spatiotemporal parts* of concrete particulars are of two types: spatial parts and temporal parts, of which the former are less contentious than the latter. I shall deal with them here briefly, as I have discussed them extensively in previous chapters. An example of a *spatial* part would be an object such as the top half of a certain apple or the middle third of my desk. Such objects are certainly concrete individuals, but they are not substances: for they depend for their identity upon the identity of the concrete particulars of which they are parts. Observe here that the sense in which such an object is a 'part' of a concrete particular such as my desk differs from the sense in which an object like one of the desk's legs is a 'part' of it: the latter is one of the desk's *components,* from which it is made—but the desk is not *composed* of its *spatial* parts. Rather—as we saw in Chapter 5—a spatial part of a concrete object is an object whose geometrical boundaries are defined in relation to that other object, conceived as already possessing an independent identity. The middle third of my desk cannot intelligibly be separated from it, in the way that one of its legs can—and it is not to be confused with the total mass or quantity of wood whose boundaries currently coincide with those of the middle third of my desk (a point I shall return to later).

Temporal parts of concrete particulars—supposing them to exist at all—are analogous to spatial parts, but with temporal boundaries replacing spatial ones. Putative examples would be such entities as my desk during the first year of its existence and the last hour of the Battle of Waterloo. Temporal parts—including even the temporal parts of substances favoured by some philosophers—cannot qualify as substances because, as is the case with spatial parts, they depend for their identity upon the identity of the concrete particulars of which they are parts.

Events are concrete individuals (they certainly occupy space and/or time), but again they are not substances, because an event is a change in the qualities or relations of one or more persisting concrete particulars (or 'continuants') and so depends for its identity upon the identities of those

other particulars. Thus the death of a horse depends for its identity upon the identity of that horse. Similarly, a particular battle depends for its identity upon the identities of the opposing armies (and perhaps also upon the time and location of their conflict). Had the Saxons fought the Danes instead of the Normans at Hastings in 1066, the ensuing battle would not have been the very battle that we identify as the Battle of Hastings. It is sometimes suggested that at least some events (such as bangs and flashes) are not necessarily changes in the qualities or relations of one or more persisting concrete particulars or continuants,[200] but I have yet to see a convincing example. (Many of the alleged examples merely illustrate the possibility of our being *ignorant* as to which persisting concrete particulars are involved; Strawson's point that 'A flash occurred' doesn't entail 'Something flashed' goes no way at all towards showing that flashes aren't always changes of *some* sort in the qualities or relations of persisting particulars, perhaps only to be revealed by scientific investigation.) It has also been urged—notably by Donald Davidson[201]—that events are individuated by the causal relations which they bear to one another, in accordance with the principle that events are identical just in case they have the same causes and effects. But, as a criterion of identity for events, this principle is viciously circular (as I remarked in Chapter 2) and does nothing to subvert the claim made a moment ago that events depend for their identity upon the identities of other, persisting particulars. (Nor would the proposal, even if tenable, undermine the claim that events are not substances, for it would still make the identity of an event dependent upon the identities of things distinct from itself, namely, other events—for no event is its own cause or effect.)

I come finally to *places* and *times,* which are again concrete individuals (quite trivially, they occupy space and time, since they are located at themselves), but once more not substances, for they owe their identity to the identities of other concrete objects which occupy space and time—in particular, to persisting things (that is, continuants) and events. In the absence of any change whatever in the qualities and/or relations of persisting things—that is, in the absence of events—time itself, and so also particular times, would not exist.[202] And *which* particular time a time is is ultimately determined by its relations to particular events (such as, perhaps, the so-called Big Bang at the origin of the universe). Again, in the absence of extended things occupying space and bearing various spatial relations

[200] See e.g. P. F. Strawson, *Individuals,* 46.

[201] See Donald Davidson, 'The Individuation of Events', in his *Essays on Actions and Events.*

[202] Here, as mentioned in Chapter 5, I disagree with Sydney Shoemaker: see 'Time Without Change', in his *Identity, Cause, and Mind.*

to one another, space itself, and so also particular places, would not exist. And *which* particular place a place is is ultimately determined by its relations to particular extended things (such as, perhaps, the clusters of galaxies distributed throughout the universe). Particular places and times are intrinsically featureless and so lack any internal basis for differentiation amongst themselves. Moreover, it is hopeless to suppose that places and times could be individuated solely by relations amongst themselves, any more than events can be so individuated; nor would this, in any case, serve to confer substantival status upon them in accordance with my proposed definition of substance.

5. Substances Identified

Having discussed some of the principal categories of non-substantial concrete particulars, we are now in a position to consider the substances themselves. I take it (and shall defend this assumption as I proceed) that typical examples of substances are such objects as an individual clock and an individual horse—the former an *artefactual* substance, the latter a *natural* one. These two objects are examples of *composite* substances. (Non-composite substances will be discussed in the next section.) A *composite* object is one that has component parts which together serve to *compose* it—as a clock is composed of such parts as wheels and springs and a horse is composed of such parts as bones and internal organs. However, composite substances, although they are wholes composed of various parts, are not mereological sums of those parts, in the way that quantities of matter and collectives are.[203] The proof of this is that composite substances can persist identically through changes in their component parts (subject to certain constraints to be discussed in the next section). Thus, for example, a clock may survive a replacement of one of its wheels or springs and a horse may survive the loss of one of its internal organs or bones (subject, perhaps, to its replacement by a new one through regeneration or transplantation). This is why composite substances do not depend for their identity upon the identities of their proper parts (in the way that quantities of matter and collectives do). *Which* particular clock a certain clock is is not determined by *which* particular wheels and springs it is composed of, since that very clock can come to possess different wheels and springs and its former wheels and springs can come to be possessed by other clocks. (I shall return to this claim in a moment, however,

[203] Cf. my *Kinds of Being,* ch. 6.

as it may be disputed by some philosophers who believe in the so-called necessity of origin.)

It is true that a composite object such as a clock or a horse depends *generically* upon its component parts, though that is quite consistent with its substancehood, as we saw earlier. But it is metaphysically possible for a particular clock or horse to exist unaccompanied by any concrete particular other than its own component parts and certain entities strongly dependent (that is, identity-dependent) upon it and its component parts. (That this is perhaps *physically* or *naturally* impossible according to currently accepted scientific laws is beside the point.) Consequently, a composite object such as a clock or a horse does not depend for its *identity* upon the identity of any other entity whatever. It does not depend for its identity upon the identities of its own component parts (as we saw earlier). And it does not depend for its identity upon the identity of anything *other* than its own component parts: for the only other concrete entities which would *need* to exist in addition to it and its component parts are entities which, were they to be its sole additional concrete companions, would depend for their identities upon *it* (or its component parts)—thereby ruling out the possibility of its being identity-dependent upon *them,* in view of the antisymmetrical character of identity-dependence. (I take it to be obvious, by the way, that a concrete object such as a clock or a horse cannot depend for its identity upon *abstract* entities of any type.)

To confirm the foregoing judgement, let us just consider what some of those additional concrete companions would have to be. First of all, we might adduce the *spatial and temporal parts* of our hypothetically solitary clock or horse. But we have already seen that these would depend for their identities upon *it,* so that it, being distinct from them, could not in turn depend for its identity upon *them*. Nor can it be said that the identity of our solitary clock or horse would depend upon the identities of particular *places or times*: for although it is true that *some* places and times must exist if an extended and persisting object such as a clock or a horse is to exist in space and persist identically through time, *which* particular places and times those are has no bearing on the identity of that extended and persisting object. Moreover, if a composite object such as our clock or horse *were* to exist in isolation, it and its component parts—being, *ex hypothesi,* the sole material occupants of space and time—would then be the very entities upon whose identities the identities of those places and times would themselves depend.

But perhaps it will not be so easily granted that the identities of particular places and times have no bearing on the identity of a particular composite object such as a clock or a horse. For, given that different clocks, say, could at different times be composed of the same component

parts, it may be urged that all that can determine the identity of *this* particular clock is that it began its existence when certain component parts were originally put together at a particular time and place.[204] This would make the identity of such a composite object depend upon the identity of a certain *event,* namely, the event of its construction or original composition—and this event would in turn appear to depend for *its* identity upon the identities of those original components and, arguably, the identity of the time of their being combined together in the appropriate way. And thus it might appear that even our earlier claim that the identity of a composite object such as a clock does not depend upon the identities of its components needs qualification, in that it *does* depend for its identity upon the identities of its *original* components, even though it may survive a replacement of these.

However, this contention may be challenged. It is not at all clear, I suggest, that the identity of a composite object *can* be fixed by the identity of the event of its original composition, since there are good grounds for claiming that the reverse is in fact the case. For if we ask in virtue of what it is that the putting together of certain component parts at a certain time was the event of the original composition and hence coming into being of *this* particular clock, it seems proper to reply that it was so only in virtue of the fact that the history of this particular clock may be traced back just as far as that act of composition. *Which* particular event was the 'birth' of this clock seems to depend, then, on *which* particular clock this is, rather than vice versa. From this perspective, indeed, it appears to be perfectly intelligible to suppose that this particular clock *might* (and not just in an epistemic sense of 'might') have begun its existence with different original components, put together at a different time. In confirmation of this it may be pointed out that there is no absolute metaphysical necessity for any composite object to have had a beginning to its existence at all, although it *is* metaphysically necessary that it should have a determinate identity. But the view which I am challenging would make that identity dependent upon the identity of an event of original composition, and hence appears to imply, mistakenly, that such an event must have occurred.

6. Composite and Non-Composite Substances

As we have already seen, some substances are *composite* objects: they have concrete component parts (which may themselves be substances) of which

[204] Cf. Kripke, *Naming and Necessity,* Lecture III.

they are composed, but of which they are not the mereological sum. These, then, are *composite substances*. It must be stressed, however, that the possession of *spatiotemporal* (spatial and temporal) parts does not of itself make for compositeness in a substance, because a substance is not *composed* of such parts even if it has them. A substance is only composed of such parts as could, metaphysically, be removed from it and continue to exist in separation from it. As I remarked earlier, a spatial part of my desk, such as the bottom three inches of one of its legs, cannot be so removed—unlike the mass or quantity of wood which currently coincides with that spatial part of my desk. Observe here that the wood in that spatial part of my desk is not essential to it: for as long as the leg of my desk remains unaltered in its geometrical dimensions, the spatial part which is its bottom three inches continues to exist, even if the particular quantity of wood occupying it were to migrate elsewhere and be replaced by new and different wood. Thus, making a cut three inches from the bottom of the leg separates the quantity of wood then occupying those bottom three inches from the rest of the desk, but does not *separate* the spatial part of the desk which is the bottom three inches of that leg—rather, it *annihilates* that spatial part. For, what making such a cut does is to make my desk's leg three inches shorter than it was. But then it seems clear that *that* three inches of the leg (as opposed to the wood that occupied it) can no longer exist, for the length of the leg cannot be less than the sum of the lengths of its non-overlapping spatial parts.

Nor will it do to urge that the bottom three inches of the leg continues to exist but simply ceases to be a spatial part of the leg. For what *is* it then, if no longer such a spatial part?—not a mere piece of wood, for we have already seen that the wood previously occupying it is not essential to it, as it would be to a piece of wood. An object cannot survive a change in its essential properties. (Of course, there *is* a piece of wood three inches long remaining after the cut has been made—I am merely denying that this can coherently be identified with the object that was previously individuated as the bottom three inches of the leg, since they differ in their essential properties.) So, to repeat, a spatially extended substance is not *composed* of its spatial parts—and the same may be said of its *temporal* parts (objects such as my desk during the first year of its existence, if we countenance such objects at all). Consequently, a non-composite or *simple* substance may certainly have spatial and temporal parts—the latter, at least, if any substance can have them. (If one still finds it difficult to understand how an extended object may have spatial parts and yet not in any sense be *composed* of them, and so be a simple whole, it may help to think of a *rainbow*—although this is not, of course, a substance—whose different coloured bands are spatial but not component parts of it.)

7. Composite Substances and Identity Over Time

In the case of composite substances, their identity over time (their *diachronic* identity) is always grounded in some equivalence relation defined over their actual or possible components (the concrete objects that do or may compose them). *What* a composite substance is composed of (at any given stage of its existence) may be called its *matter,* and *how* it is so composed may be called its *form* (to adopt a familiar Aristotelian distinction, which I shall examine in more depth in Chapter 9). It is the form of a substance, rather than its matter, that must be preserved through qualitative and relational changes in that substance—such changes being *events* in which that substance participates and through which it persists identically. Thus *sameness of form* (or sameness of 'structure' or 'organization') is the equivalence relation on a substance's components which grounds its diachronic identity: and precisely what this equivalence relation is will depend on what *kind* of substance the substance in question is. To state what this equivalence relation is for composite substances of a given kind is precisely to provide a *criterion of identity* for such substances (in the sense explained more fully in Chapter 2).

It should be noted that, in as much as composite substances typically instantiate not just a single kind but a *hierarchy* of kinds, the kind which determines a substance's 'form' for the purposes of providing its criterion of identity (that is, the form whose sameness must be preserved throughout the persistence in time of that particular substance) is the *highest* kind in the hierarchy of kinds instantiated by that substance. This must be acknowledged in order to accommodate the metaphysical possibility of a particular substance's undergoing processes of *metamorphosis,* in which it changes from being an instance of one sub-kind of a higher kind to being an instance of another sub-kind of that higher kind (a possibility I shall discuss in much more detail in Chapter 8). The only metamorphosis that a substance metaphysically cannot undergo is a change whereby it ceases to be an instance of what was formerly its highest kind and becomes an instance of a new highest kind—for this would, absurdly, permit one and the same particular substance to be successively governed by two different and mutually incompatible criteria of identity.

It should also be noted that the fact that composite substances have their diachronic identity grounded in equivalence relations defined over their actual or possible components does not in any way compromise their status as *substances,* as defined earlier. For to say that the diachronic identity of a composite object is *grounded in* an equivalence relation defined over its actual or possible components is not to say that its identity

depends on the identities of its components. To say the latter is to say that *which* particular object of its kind a composite object is is determined by *which* particular objects of their kinds its components are: and we have already seen that one *cannot* say this of a composite object such as a clock or a horse which is not the mereological sum of its component parts. A clock must indeed *have* appropriate component parts (wheels and springs and so forth), but their identities have no bearing on *its* identity since it can survive their replacement by numerically distinct component parts—provided that the replacement proceeds in a fashion which preserves the clock's 'form', that is, in such a way that it continues to possess parts of the appropriate kinds combined together in the right sort of way. It is this 'sameness of form'—that is, the preservation of an appropriate structure of component parts of suitable kinds (wheels, springs, and so on)—which secures the continuing numerical identity of a clock through a change in its 'matter': and the fact that the equivalence relation in question is necessarily defined over objects apt to constitute parts of a clock (objects such as wheels and springs) in no way makes the identity of a particular clock dependent on the identities of its particular components.

8. Primitive Substances

A non-composite or *simple* substance—one that has no component parts—must, it appears, have *no* criterion of diachronic identity. For, in the first place, its diachronic identity cannot, as with composite substances, be grounded in an equivalence relation defined over its actual or possible component parts, since *ex hypothesi* it has none. But, furthermore, it does not appear that its diachronic identity could be grounded, either, in any equivalence relation defined over concrete entities of any other type, as we shall now see.

We can immediately rule out any criterion of identity for a simple substance which purports to ground its diachronic identity in any equivalence relation defined over concrete particulars which themselves *depend for their identity* upon the identity of that simple substance—particulars such as its spatial and temporal parts (if it has any), or events in which it is a participant. For any such purported criterion of diachronic identity would inevitably be viciously circular. (No such circularity afflicts the criterion of identity of a composite substance precisely because its actual or possible components, being objects capable of an existence entirely separate from it, do not depend for their identities upon the identity of that substance.) A diachronic identity criterion for a persisting concrete object is supposed to tell us, in a non-circular way, what relationship has to be

preserved in order for that object to persist identically through time: but if the proposed relationship is one which requires to be defined over particulars which owe their identities to the identity of the very persisting object in question, then the preservation of that relationship presupposes the continuing identity of that object, and this introduces a fatal circularity into the proposed criterion. For instance, it is useless to be told that what needs to be preserved in order for an object to persist identically through time is some relationship between successive *temporal parts* of that object, because which objects those temporal parts *are* is partially determined by the identity of the persisting object which has them. Thus, it cannot be stated *which* successive objects have to be related in the proposed way save in terms which refer to the existence of the *same* persisting object at different times, and hence in terms which take its diachronic identity as already given. (Recall, here, our criticisms of the temporal parts approach to persistence in Chapter 5.)

We can also rule out any criterion of identity for a simple substance which purports to ground its diachronic identity in any equivalence relation defined over concrete particulars which are *existentially independent* of that substance (existentially independent, that is, even in the 'weak' non-generic sense of dependence discussed in Chapter 6)—particulars such as other substances related causally or spatiotemporally to that substance, or particulars such as the places and times occupied by that substance. For no such criterion would be consistent with the assumed substantial status of the object concerned. One way of demonstrating this is to point out that if a concrete object is genuinely a simple substance, then it could, metaphysically, exist unaccompanied by any other concrete entity apart from certain concrete entities strongly existentially dependent upon itself—and *continue* to exist, or *persist,* in this condition. From this it follows that its persistence could not depend on the preservation of any relationship involving other, independently existing concrete particulars, such as other substances.

I cannot envisage any putative criterion of identity for a simple substance that is not covered by the two possibilities considered and dismissed in the preceding two paragraphs. This being so, I conclude that the diachronic identity of a simple substance cannot be grounded in any equivalence relation defined over objects distinct from itself—which is just to say that it can have *no* criterion of diachronic identity at all. In other words, the identity over time of a simple substance is necessarily *ungrounded* or *primitive.* In consequence, such a substance may aptly be described as a *primitive* substance. And I contend that all and only simple substances are primitive substances (for composite substances, as we have

seen, have their diachronic identity grounded in relations on their component parts).

9. What Primitive Substances Are There?

We have done nothing so far to establish that there *are* any primitive substances, but it is strongly arguable that there must indeed be at least some. For in the absence of any primitive substances, it appears, no other concrete objects could exist at all, including even places and times. All concrete objects which are not primitive substances are either composite substances or else non-substances. But how could these be all the concrete objects that exist? First, it couldn't be the case that all existing concrete objects are *non*-substances, because these, by definition, are all identity-dependent upon other concrete objects and yet, on pain of an infinite regress of a sort that is ruled out by the well-foundedness assumption of section 2 above, if any concrete object is to exist at all, one must exist which is not identity-dependent upon any other: that is, some substance must exist. But, secondly, not all substances could be *composite* substances, it seems, because this too would require there to be infinite descending chains of objects standing in relations of existential dependency to one another (albeit dependency of the 'generic' variety rather than of the 'strong' variety). For every composite substance demands the existence of other concrete objects to serve as its component parts, and the asymmetry of part–whole relations implies that a composite object cannot itself be a part of one of its own components—so that the component parts of a composite substance, if they are composite substances themselves, demand the existence of *yet other* concrete objects to serve as *their* component parts.

How many primitive substances are there? The possibilities are exhausted by *primitive monism* and *primitive pluralism,* maintaining respectively that there is just *one* primitive substance and that there are *many* primitive substances. As to the *nature* of this substance or these substances, two further possibilities arise: the primitive substance or substances may be either *physical* or *mental*. Of course, if primitive monism is correct and there is just one primitive substance, then it must be either physical or mental; but if primitive pluralism is correct and there are many primitive substances, then either all of them could be physical, or all of them could be mental, or some could be physical and some mental.

A *physical* substance, as I understand this term here, is one which necessarily exists in *both space and time*. By contrast, I take a mental substance

to be one which only necessarily exists in *time*—so that if a mental substance exists in space at all, then it does so only *contingently* and *derivatively,* by virtue of some contingent relationship which it bears to physical objects of some kind, certain of whose spatial properties and relations it may be said to inherit through that relationship. Such a relationship may be termed 'embodiment'.[205]

If the only primitive substances are mental substances, then it appears to follow that there are in fact *no* physical substances and that space is unreal. This is because in that case nothing will underivatively occupy space: primitive substances will not do so, because *ex hypothesi* they will all be mental and so exist in time alone, or if also in space then only contingently and derivatively, in virtue of being suitably related to other concrete objects which occupy space. But other concrete objects will only be able to occupy space in as much as the objects to which they owe their existence occupy space themselves: and in the case hypothesized this requirement cannot ultimately be satisfied, because no primitive substance will occupy space underivatively. So in that case nothing will occupy space, whence there will be no physical substances and indeed no space, because space itself owes its existence to the existence of concrete objects capable of occupying it.

If primitive physical substances *do* exist, then either there is just *one* of them or else there are *many* of them. The latter view may be called *physical atomism* and the former view *physical holism*. Modern physical science provides no basis for adjudicating satisfactorily between these two views, because it appears to favour both of them, despite their incompatibility. The root of this problem lies in the so-called 'wave-particle duality' at the heart of modern quantum physics, whereby basic physical phenomena can sometimes best be interpreted in line with 'atomistic' particle descriptions and sometimes best be interpreted in line with 'holistic' wave or field descriptions. According to the latter sort of account, it seems, the only primitive physical substance could be the entire physical universe as a whole, whereas according to the former sort of account individual fundamental particles would appear to qualify as primitive physical substances (though here we would do well to recall the findings of Chapter 3, which indicated that such particles can at best be regarded as what I there called 'quasi-objects'). To the extent that the best-informed explanatory theories of modern physical science appear, inconsistently, to favour both atomism and holism, we may be inclined to doubt whether there are in reality *any* primitive physical substances—and consequently to doubt whether any physical substances at all really exist. We might be inclined to conclude

[205] See further my *Subjects of Experience,* 37–8.

that matter and space are, at best, in Leibniz's phrase, *phenomena bene fundata.*

Are there any primitive *mental* substances—indeed, are there any mental substances at all? If primitive mental substances do exist, then again either there is just *one* of them or else there are *many* of them. The latter view may be called *mental atomism* and the former view *mental holism* (neither to be confused with similarly entitled doctrines concerning mental states and their contents). The most likely candidate for the status of a primitive mental substance is an individual *self*. That being so, mental holism would amount to a kind of solipsism and is to that extent a highly implausible doctrine. (Another kind of mental holism is the doctrine of the 'world soul', which is equally implausible.) And, indeed, there are plausible arguments to the effect that individual selves *are* primitive mental substances. That a self is a *substance* as defined earlier and moreover a *non-composite* substance whose identity over time is accordingly primitive or *ungrounded,* are all claims for which support can be mustered—as is the claim that selves necessarily exist in time but at most only contingently in space and are consequently *mental* substances. However, I shall not argue directly for these claims here.[206]

Although, as I have just said, we may seriously doubt the reality of physical substances and consequently the reality of space, we cannot likewise cogently doubt the reality of *time* (notwithstanding the spurious arguments of certain metaphysicians such as McTaggart, whose views I touched on in Chapter 4). For although the appearance of distance and so of space may conceivably be no more than an appearance (as Berkeley held), the appearance of change and so of time cannot be no more than an appearance—for even the *appearance* of change itself involves change, namely, change in the conscious experience of a subject or self.[207] But if time is real, then at least *some* primitive substances existing in time must exist, for the reasons given earlier. And since we have reason to doubt whether these are physical substances, to that extent we have grounds for concluding that these primitive substances must be *mental* substances, with individual selves constituting the most plausible candidates.

[206] But see further ibid. ch. 2.

[207] Cf. P. T. Geach, Truth, Love and Immortality: An Introduction to McTaggart's Philosophy (London: Hutchinson, 1979), ch. 7.

8 Categories and Kinds

My primary aim in this chapter is to examine some of the ways in which the a priori categorial distinctions of ontology combine with the a posteriori deliverances of observation and scientific theory to yield and justify our conception of the world as primarily constituted by individual substances belonging to discrete natural kinds. (The topic of artefactual kinds is one that I largely set aside for time being.) I shall approach the issue through a consideration of the *problem of substantial change,* since a principled differentiation of kinds presupposes a resolution of this problem. In the course of dealing with the problem, I shall carry further forward the investigation into the categorial structure of reality begun in earlier chapters.

1. Substantial Change Versus Phase Change

When some water changes into ice, is this a change from one substantial kind to another, a *substantial* change? Or is it merely a change within a single substantial kind, a *phase* change? How should we decide what to say in such cases? Before we can look at some answers to such questions, I need to settle a matter of terminology. Normally, a 'substantial' change is understood to be one involving either the *ceasing-to-be* or the *coming-to-be* of an individual substance. However, in what follows I shall simply take a substantial change to be one in which an individual substance either ceases to instantiate a given substantial kind or else begins to instantiate such a kind, without prejudice to the question of whether such a change necessitates either the ceasing-to-be or the beginning-to-be of that individual substance. Thus, if a change *does* involve the ceasing-to-be of an individual substance, then it will *a fortiori* count as a substantial change in my sense, since it will be one in which that individual substance ceases to instantiate any substantial kind. On the other hand, for reasons which will become plain later, I do not wish to rule out the possibility of an individual substance ceasing to instantiate one substantial kind and yet continuing to exist, as an instance of a different substantial kind. As for a

phase change, I take this to be one in which an individual substance undergoes certain qualitative changes (usually rather striking ones), while continuing to exist as an instance of a given substantial kind. Finally, for present purposes I am content with an informal characterization of an 'individual substance' as a persisting, concrete 'thing', or 'continuant', examples of such substances being individual plants, animals, rocks, stars, tables, and people. A more formal and precise account of the nature of substance was developed in Chapters 6 and 7, but the arguments of the present chapter are relatively independent of that account. Most importantly, in the present chapter I shall not insist, as I do in my more formal account, that particular quantities or pieces of matter do not qualify as individual substances. This is because the differences between such particulars and those more strictly denominated substances are not germane to the main concerns of this chapter. (And, indeed, in support of this more relaxed use of the term 'substance', I might appeal to the fact that the most widespread use of that term in colloquial English is to refer to natural kinds of stuff, such as water or gold.)

On our question concerning the change from water to ice, John Locke ventures the following interesting, though contestable, opinion:

> If I should ask any one, whether *Ice* and *Water* were two distinct *Species* of Things, I doubt not but I should be answered in the affirmative: And it cannot be denied, but he that says they are two distinct *Species,* is in the right. But if an *English-man,* bred in *Jamaica,* who, perhaps, had never seen nor heard of *Ice,* coming into *England* in the Winter, find, the Water he put in his Bason at night, in a great part frozen in the morning; and not knowing any particular name it had, should call it harden'd Water; I ask, Whether this would be a new *Species* to him, different from Water? And, I think, it would be answered here, It would not to him be a new *Species,* no more than congealed Gelly, when it is cold, is a distinct *Species,* from the same Gelly fluid and warm; or than liquid Gold, in the Fornace, is a distinct *Species* from hard Gold in the Hands of a Workman. . . . [T]he ranking of Things into *Species* . . . is done by us, according to the *Ideas* that we have of them. . . . [I]f we suppose it to be done by their real internal Constitutions, and that Things existing are distinguished by Nature into Species, by real Essences, according as we distinguish them into *Species* by Names, we shall be liable to great Mistakes.[208]

Here Locke displays his nominalistic antirealism with regard to 'natural' kinds. However, Locke's suggestion that those familiar with both liquid

[208] See Locke, *Essay,* III. vi. 13. For further discussion of Locke's views about substance and essence, see my *Locke on Human Understanding* (London: Routledge, 1995), ch. 4. The present chapter carries further forward an examination of the problem of substantial change begun in my *Kinds of Being,* ch. 10.

water and ice would confidently judge them to be two *different kinds* (or 'species') of thing is surely mistaken. On the contrary, it seems likely that most would agree with Locke's imagined Jamaican that the solid stuff found in the basin on a cold morning is just *hardened water*—that is to say, *water* in a solid rather than a liquid state. Moreover, the judgement that this is so relies in no way upon any presumed knowledge concerning the 'internal constitutions' of the solid and liquid stuffs, but rests entirely upon knowledge of certain macroscopically observable phenomena, in so far as it is an empirical judgement. (It is not common knowledge, amongst those who judge water and ice to be the same in kind, that both are constituted by molecules of H2O, nor is it even a presumption on their part that water and ice have the same molecular constitution—for the atomic theory of matter is not implicit in our everyday conception of material stuffs.) Locke is surely wrong to suppose, as he seems to, that the only alternative to his radical nominalism is an essentialism which appeals to the 'internal constitutions' of substances, known (if at all) only to scientific experts.

So what, then, *are* the relevant macroscopic features of the change from water to ice, observation of which persuades the layman to judge that this is merely a phase change, not a change of substantial kind? They are, I think, the following. (1) The change is readily replicable, as a natural effect of an alteration in certain environmental conditions (in this case, temperature and pressure). (2) The change is relatively gradual and continuous (first the water gets denser, then less dense, after which ice crystals begin to form and spread until the whole mass is solid). (3) The change is naturally reversible (the reversal in this case being achieved simply by restoring the original environmental conditions whose alteration was responsible for the change). Finally, (4) during the change, no matter is lost or gained by the substance involved (the ice weighs the same as the water did). (Note that allotropic changes, such as the change from graphite to diamond, qualify as phase changes by these criteria. Note, too, that what appears to be a relatively gradual and continuous change at a macroscopic level may well be discontinuous at a microscopic level: this is certainly true in the case of the transformation of liquid water into ice.)

To confirm this answer, let us compare the case of water changing to ice with various other real or imaginary cases which the layman would intuitively judge *not* to involve mere changes of phase within a single substantial kind. For if our answer is correct, we should expect to find in these cases that one or more of the features (1) to (4) are absent. Consider first, then, the case of *combustion*. When a piece of paper is consumed by flames to leave a pile of ashes, we regard what has happened as a substantial change, rather than supposing that some single kind of stuff can be white

and flexible in some conditions and grey and powdery in others. Clearly though, feature (3) is absent here: the process is not naturally reversible. Similarly, feature (4) is absent: in the course of the change matter is lost, since the ashes are manifestly lighter than the paper. Modern science tells us, of course, that in reality matter is just redistributed rather than annihilated when combustion occurs and in fact that oxygen from the air combines with the molecules in the paper in the process of oxidation. However, in the first place, this is obviously not a consideration which can be supposed to bear upon the untutored judgement of the layman. Moreover, it doesn't alter the fact that the quantity by weight of grey, powdery matter remaining after combustion is less than the quantity by weight of white, flexible material present beforehand, so that feature (4) clearly is absent in this example.

For our next example, consider the case of *natural radioactive decay*. When a lump of uranium changes into lead by a sequence of radioactive decays, modern science regards the stable end-product (the lead) as different in kind from the uranium with which the process began. But it seems clear that a layman, without benefit of scientific knowledge of the atomic constitutions of these stuffs, could agree, simply on the basis of macroscopically observable phenomena (provided he could wait long enough to observe them). Once more, the process is not naturally reversible, so that feature (3) is absent. Again, feature (4) is absent, since the quantity by weight of lead remaining at the end of the process is not the same as the quantity by weight of uranium originally present. (In this case modern science tells us that there is in fact an overall change in mass involved, since some mass is converted into energy in accordance with Einstein's formula $E = mc^2$: but, as before, this is a consideration which could not be expected to bear upon the layman's judgement.) In addition, however, not even feature (1) is present in this case, for natural radioactive decay is spontaneous, being neither caused nor affected by changes in environmental conditions.

Finally, consider the (hypothetical) example of *alchemical transmutation*. The alchemists hoped to convert base metals into gold by means of the 'philosophers' stone'. Of course, they failed. But if they had succeeded, how should we have regarded the relation between a base metal, such as lead, and gold? Should we have regarded them as really being the *same* metal, differing only in 'phase', as water differs from ice? I suggest that we should have done so only if the process of transmutation had possessed features (1) to (4). Suppose, however, that the process had possessed all of these features, but that in addition scientists had discovered (as they now have) that gold and lead are composed of atoms differing in their nuclear composition. (We now know that these atoms have different

numbers of protons and neutrons in their nuclei.) Would that additional discovery have warranted a reversal of the judgement that gold and lead are the same metal, differing only in phase? I think not. Thus I conclude that, as things actually are, what warrants the judgement that gold and lead are indeed different metals cannot just be the fact that they differ in their atomic constitutions, but rather the fact that there is no natural means of transmuting lead into gold which possesses features (1) to (4). It is true that the fact that lead and gold differ in their atomic constitutions—though only in conjunction with other facts about atoms—explains *why,* as a matter of natural law, no such natural process of transmutation can occur. But it still seems clear that this fact about their atomic constitutions is not by itself the sort of consideration which should persuade us to regard gold and lead as being stuffs of different kinds.

2. Substantial Change and Ontological Categories

Now, of course, the distinction between substantial change and phase change is not only applicable in the case of substances like water, lead, and gold. Consider, for instance, the sort of change involved when a caterpillar becomes a butterfly, or when a tadpole becomes a frog: the so-called process of 'metamorphosis'. It is clear that, in such a case, we consider that an individual substance survives a change which does not involve its ceasing to instantiate one natural kind or beginning to instantiate another. That is, we judge that the sort of change involved here is a *phase* change rather than a substantial change: for instance, we regard tadpoles as simply being *immature frogs.* But what entitles us to this judgement? Evidently, quite different features must be deemed relevant here from those we identified previously. The change from caterpillar to butterfly is not caused by environmental factors: it is, rather, endogenously caused—as we now know, by genetic factors. It is not naturally reversible. And it does involve a loss or gain of matter. Thus, features (1), (3), and (4) are all absent. On the other hand, feature (2) is present: the change is relatively continuous and gradual. So, in respect of these features, the caterpillar-to-butterfly transformation is exactly like the uranium-to-lead transformation: and yet we deem the latter to be a substantial change and the former to be merely a phase change. What entitles us to judge differently in the two cases?

The general form of the answer to this question should be obvious: pieces of stuff and living organisms are objects belonging to two quite distinct *ontological categories*—and this is something that we know a priori,

quite independently of any empirically ascertainable facts concerning the changes which may befall such objects. What is more difficult to piece together is the precise way in which such a priori metaphysical knowledge determines *which* features of a change to an object ought to be deemed relevant to the classification of that change as being a phase change or a substantial change. Note, however, one very important consequence which we can already derive from the foregoing reflections. This is that it is only in the light of an a priori metaphysical framework of ontological categories that we can make the distinction between substantial change and phase change in a principled way at all. Without such a framework we are in no position to choose between a 'Heraclitan' or a 'Spinozan' view of natural change, or any view in between these extremes—the Spinozan view being that all changes are phase changes within a single substance and the Heraclitan view being that every change brings into existence an entirely new entity and destroys what existed before. Only in the light of metaphysics can we vindicate a judgement that a caterpillar survives its transformation into a butterfly whereas a pig does not survive its transformation into the flesh of the python which devours it, or the judgement that water survives its transformation into ice whereas paper does not survive its transformation into ash. Neither macroscopically observable phenomena, nor scientific information concerning the 'internal constitutions' of things, can resolve such issues for us in the absence of metaphysical guidance. Thus even the fact, for instance, that the butterfly's DNA is the same as the caterpillar's cannot of itself show that the transformation of the latter into the former is not a change of substantial kind, any more than the fact that the atoms constituting lead and gold have different nuclear compositions of itself shows that the hoped-for alchemical transformation of lead into gold could not be a phase change.

Ontological categories must not be confused with natural kinds: for natural kinds, as we have just seen, can only be differentiated in a principled way relative to an accepted framework of ontological categories. Our next task, then, must be to articulate such a framework of categories and find a place for kinds within it.

3. Categorial Relations and the Ontological Status of Kinds

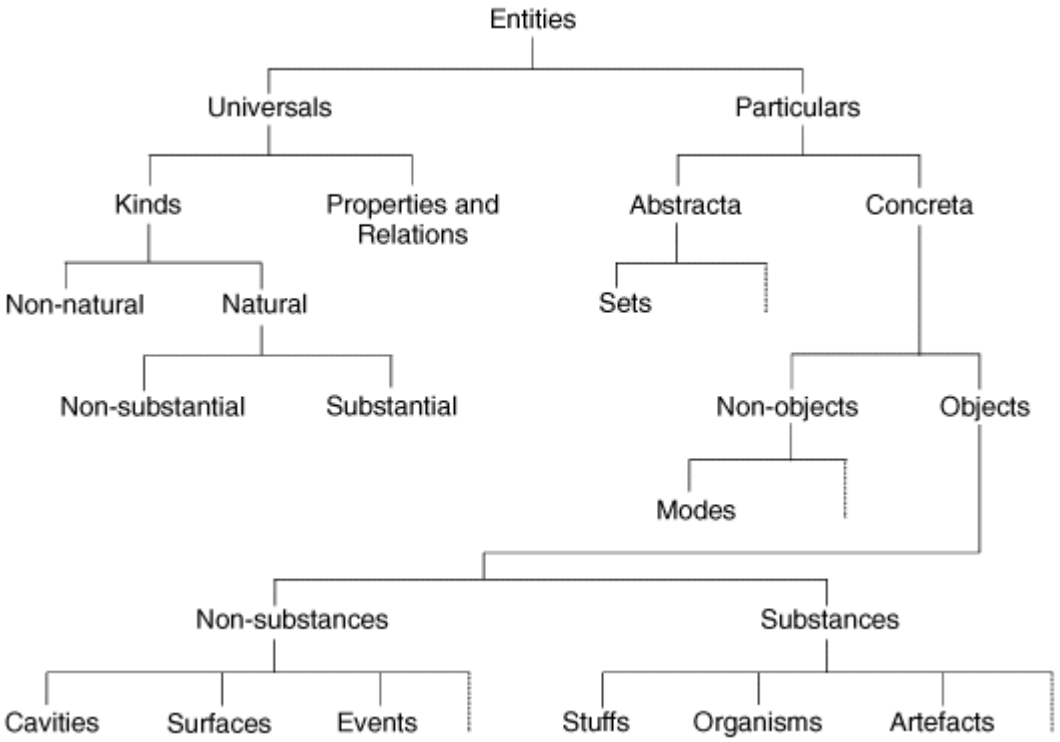
Entities belong to different ontological categories on account of their different existence-conditions and/or identity-conditions. The categories are related to one another in a hierarchical arrangement. The topmost ontological category in the hierarchy is, thus, the most general ontological

category of all—the category of *beings,* or *entities*. What the highest *division* of this category should be is a matter for some dispute, however, as is the question of whether a categorial scheme should permit a certain amount of cross-classification (my own view being that this is inevitable). Some metaphysicians take the highest division to be that between *abstract* and *concrete* entities—as I have tended to do in previous chapters—but others take it to be that between *universals* and *particulars,* while yet others take it to be that between *necessary* and *contingent* entities.[209] It is very probable that this choice is not all that important, rather as one can have different axiom-sets for the same logical system or system of geometry. For present purposes, however, I shall assume that the highest division is that between *universals* and *particulars*. I shall then assume that all particulars are either *abstract* or *concrete*. (I also assume—for reasons given in section 1 of Chapter 7—that all universals are abstract, so that here already we encounter some cross-classification). As I explain in other parts of this book, by a 'concrete' entity I mean one which exists in space and time, or at least in time, so that an 'abstract' entity is one which exists in neither space nor time. Figure 1 depicts the sort of categorial scheme which I currently favour (though I should emphasize that the diagram is incomplete, intentionally allowing room for expansion at various points and ignoring certain distinctions which are more important for the purposes of other chapters than they are here).

In view of our central concern in this chapter with natural kinds, the first thing to notice about the categorial scheme represented in Figure 1 is that kinds are categorized there as *universals*. Equally importantly, however, they are distinguished from another sub-category of universals, that of *properties and relations*. The basis of this distinction, as I indicated in section 1 of Chapter 7, lies in the ontological status of the particular instances of these two sub-categories of universals. What is at issue here is the categorial distinction amongst particulars between 'objects' and 'non-objects'. (Note, incidentally, that I do not think of the latter distinction as applying only to concrete particulars: I am happy to acknowledge the existence of *abstract* objects—so here again we see that cross-classification is inevitable in a workable categorial scheme.) Now, I conceive of kinds as universals whose particular instances are *objects,* whereas I conceive of properties (or, at least, first-order properties) as universals whose particular instances are *modes*. By an *object* I understand an entity possessing

[209] For an example of the first of these positions, see Hoffman and Rosenkrantz, *Substance Among Other Categories,* 14 ff.; for an example of the second, see Grossmann, *The Existence of the World,* 1 ff.; for an example of the third, see Roderick Chisholm, 'Ontologically Dependent Entities', *Philosophy and Phenomenological Research,* 54 (1994), 499–507.

Figure 1



determinate identity-conditions (see again Chapters 2 and 3). Non-objects may be said to *exist,* but not to have fully determinate identity-conditions, whence it makes no sense to attempt to *enumerate* non-objects of any sort. Modes, then, I regard as concrete non-objects, examples being such entities as a particular smile or a particular wave (of the seaside variety, as opposed to a wave of the hand, which is an *event*). One may truly make such statements as 'A smile flickered over John's face' and 'The sea rose up in great waves', but one cannot, I think, answer in a principled and non-arbitrary way questions such as 'Does John have the same smile on his face now as he did ten seconds ago?' and 'How many waves are there now on (this part of) the sea?'.

Modes are simply *particularized properties of objects.* Thus, smiles and waves are particularised *shape* properties of physical objects: a smile is a particular way in which the lower part of a face is configured and a wave is a particular way in which the sea's surface is configured. There are also *colour* modes, such as the particular shade of red of a certain apple's skin. Some philosophers call such entities 'tropes', but I prefer the older term 'mode' (or 'individual accident'), because this term rightly carries the implication that such entities are *existentially dependent* ones, depending for their existence upon the objects (often substances) which 'possess'

them. One way to register the asymmetrical existential dependency which modes have upon the objects which possess them is to say that modes are 'adjectival' upon objects. Another way, invoking Fregean terminology, is to say that modes are 'unsaturated' entities.[210]

Many self-styled *trope* theorists would say that (what I call) individual substances are reducible to, or constituted by, bundles of 'compresent' tropes.[211] This is where I part company with them. One of my reasons for disagreeing with them is precisely that I do not believe that tropes or modes can have well-defined or fully determinate identity-conditions and hence do not believe that they should be thought of as 'objects'. It seems that tropes would *need* to have fully determinate identity-conditions themselves in order for individual substances possessing such conditions to be constituted by trope-bundles: and yet that is what they apparently cannot have. Individual substances certainly are objects, in my terminology, but it is hard to see how objects could be constituted by bundles of *non*-objects. However, rather than repeat here my reasons for thinking that tropes or modes cannot have fully determinate identity-conditions, I refer the reader to my discussion of this matter in section 13 of Chapter 3 above.

For purposes of illustration, let us just see how the categorial scheme depicted in Figure 1 can be applied in the ontological analysis of a relatively simple and familiar state of affairs, such as the existence of a particular red apple. Here we have an individual substance, the apple, which is an instance of the natural substantial kind *apple* and which possesses the property (a universal) *redness*. Notice that while the apple is an instance of the kind-universal *apple,* it is *not* itself an instance of the property-universal *redness*. The latter universal does indeed have a particular instance here, namely a colour mode of the apple—the apple's particularized property of redness (of a quite specific, determinate hue). The apple 'possesses' the *universal* property of redness precisely in virtue of possessing a particular mode of that property, red modes being particular instances of the universal property of redness. And one reason why we need to acknowledge the existence of modes is precisely in order to explain how it is that an individual concrete object, such as an apple, can 'possess' a universal property, such as redness, despite the fact that such a universal is an *abstract* entity and hence non-spatiotemporal in nature. It seems clear that there must be something about how, concretely, the apple is in itself which warrants the ascription to it of precisely *this* abstract universal,

[210] See 'On Concept and Object', in *Translations from the Philosophical Writings of Gottlob Frege,* and also section 4 of Chapter 2 above.

[211] See further Campbell, *Abstract Particulars,* and Simons, 'Particulars in Particular Clothing'.

redness, rather than another. The solution is to say that the apple 'has' redness, the universal, in virtue of being coloured in a red way—that is, in virtue of having a *red mode,* where this is itself a *concrete particular,* the particular way in which the apple is coloured.

This example brings to the fore, once more, the need to distinguish between kind-universals and property-universals. Without making that distinction, we do not possess the resources wherewith to express the quite different ontological relationships in which an individual substance stands to its substantial kind, on the one hand, and to the properties which it possesses, on the other. The individual substance is an *instance* of its kind but not of its properties: rather, its *modes* are instances of those properties. (I shall return to this issue in the next chapter.)

4. Natural Kinds, Taxonomy, and Sortal Persistence-Conditions

Armed with these ontological distinctions, we can return now to the topic of *natural* kinds and their differentiation. The particular instances of natural kinds possess certain properties as a matter of natural necessity, in so far as they instantiate those kinds: for example, lumps of gold are yellow and tigers are carnivorous—statements like these being *nomological* statements, or statements of *natural law.*[212] Natural kinds may be contrasted with *non-natural* kinds (artefactual kinds being a subclass of the latter) and they may be either *substantial* or *non-substantial,* depending on the ontological category of their particular instances. Here, however, we are going to focus on *natural substantial kinds.* Some examples are the kinds *tiger, apple,* and *gold.* Now, the individual substances which are instances of such kinds *persist through time,* the possibility of such persistence being one of the essential characteristics of the category of substance. Accordingly, many of the natural laws characterizing such substances concern their natural temporal development and the changes which they can and cannot naturally undergo. Thus, every natural substantial kind has associated with it, as a matter of natural law, what I call a set of *sortal persistence-conditions* for its instances.[213] To be a tiger, for example, an individual substance must develop in a certain way over time: as a matter of natural law, there are certain types of change which a tiger must undergo, if it is to remain a tiger, and others which it cannot undergo. As

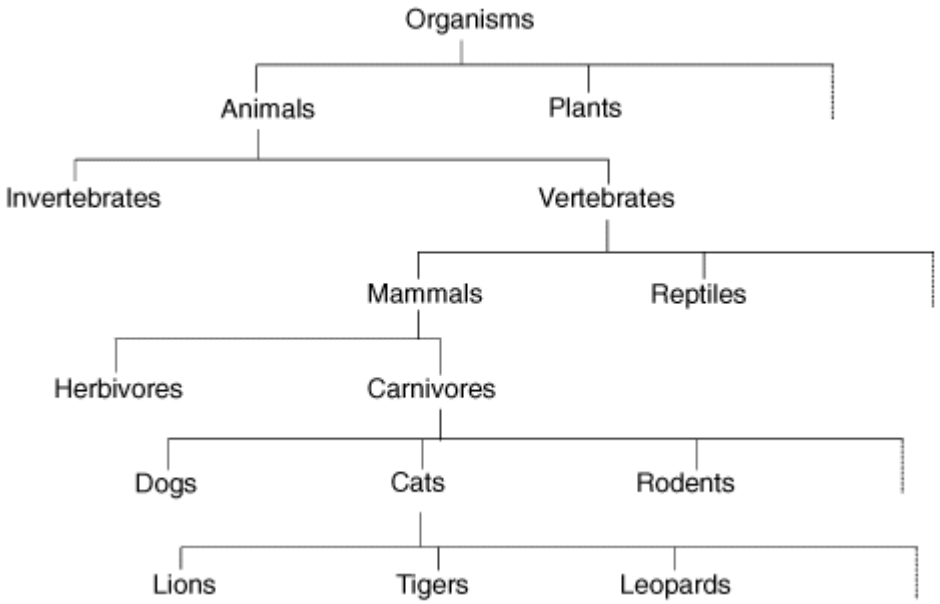
[212] For elaboration and defence of the thesis that natural kinds are distinguished by their being subjects of natural law, see my *Kinds of Being,* chs. 8 and 9.

[213] For more on sortal persistence-conditions, see my *Subjects of Experience,* ch. 2, and also section 11 of Chapter 2 above.

we shall see, however, it is vitally important to distinguish between such sortal persistence-conditions and the diachronic *identity-conditions* of individual substances. The former are the conditions under which, as a matter of natural law, an individual substance persists as an instance of a certain natural substantial kind. The latter are the conditions under which an individual substance is reidentifiable over time and are the same for all individual substances falling within the same ontological sub-category of substance. (Thus, referring to Figure 1, the sub-categories of stuffs, organisms and artefacts each have different diachronic identity conditions associated with them.) To conflate these two types of conditions is to neglect the metaphysical possibility of what I shall call *radical* metamorphosis, or *transubstantiation,* this being a transformation in which one and the same individual substance changes in respect of its substantial kind.

Natural kinds are related to one another in hierarchical structures, which we may call *taxonomic* structures, in order to distinguish them from the *categorial* hierarchies of ontology. Figure 2, which is intentionally very incomplete, provides a simple example of such a taxonomic structure.

Figure 2



What is depicted here is definitely not part of the *categorial* structure of reality. The kinds featuring in Figure 2 are all just *organic natural substantial kinds* and as such are items belonging to the same ontological category. As I remarked at the end of section 2 above, ontological categories must not be confused with natural kinds.

Categorial structure is an a priori matter. By contrast, taxonomic relations between natural kinds are an a posteriori matter of natural law. Consequently, it is of no concern to me that the taxonomy depicted in Figure 2 may not accord exactly with the latest fashion in biological classification, for this is an empirical matter open to constant revision.[214] On the other hand, a categorial scheme, being a priori, should not be open-ended or provisional in quite this way. Now, *sortal persistence-conditions* reflect *taxonomy,* not the categorial structure of the world, whereas *identity-conditions* are purely metaphysical and a priori. For example, it is an a posteriori matter that tadpoles develop first gills and then lungs, so that no organism which developed in a different way could qualify naturally as a frog. But, by contrast, it is an a priori truth that a living organism—unlike a piece of stuff—can undergo a change of material content. Here we can fruitfully appeal to something like the traditional distinction between *matter* and *form* (which I shall look at much more closely in the next chapter). That individual substances of a certain category have their survival over time grounded in preservation of *form* rather than of *matter* is an a priori truth: but precisely what *constitutes* 'form' for a certain kind of substance within this category is partly an a posteriori question. We discover *empirically* that there is a kind of creature the preservation of whose 'form' permits (or, indeed, requires) the gills-to-lungs development. But *how,* exactly, do we 'discover' that? Why *don't* we say that tadpoles die and are replaced or superseded by 'adult' frogs, and similarly that caterpillars die in order to give birth to butterflies? Why, in other words, do we treat 'tadpole' and 'caterpillar' as *phase* sortals? Here we return to the issues raised earlier, in sections 1 and 2 above.

5. A Return to the Problem of Substantial Change

One highly pertinent thing which we discover in the tadpole case is that it is a matter of natural law (and so of natural necessity) that tadpoles lose

[214] This, too, is why I am not much alarmed by John Dupré's recent arguments against 'essentialist' conceptions of natural kinds, appealing to divergences between biological classifications and those of everyday language and to disagreements between biologists themselves over the 'correct' way to classify living organisms: see his *The Disorder of Things: Metaphysical Foundations of the Disunity of Science* (Cambridge, Mass.: Harvard University Press, 1993). I do not regard his 'promiscuous realism'—the view that there are 'many equally legitimate ways of dividing the world into kinds' (pp. 6–7)—as being nearly so exciting, metaphysically, as he seems to think it is. It isn't metaphysically exciting because it doesn't really concern metaphysics, properly understood.

their gills and tails—because this regularly happens in all sorts of natural environmental conditions. We also realize, however, that the very different-looking object with lungs and legs which results from this change is still a *living creature* (and this is a matter of its ontological category) and so is a thing which has the same diachronic *identity*-conditions as the tadpole. Moreover, these identity-conditions are such as to require us to *identify* the tadpole with the resultant creature. There are no grounds, then, for denying that the *same individual living organism* exists after the change as existed beforehand. This of itself, of course, does not automatically suffice to establish that the change is only one of *phase,* since there is still the metaphysical possibility of radical metamorphosis or transubstantiation to contend with. However, what rules out the latter possibility is the *natural* character of the change in question—the fact that it is a perfectly normal occurrence in nature with creatures of this kind.

Now compare this case with others which clearly need to be distinguished from it: for example, the case of an amoeba dividing, or the case of a python devouring a pig. In these cases, the number of living organisms present *is* affected by the change (the first is a case of *fission,* the second of *fusion*). Consequently, in these cases, at least one organism is created or destroyed in the process of change, and hence *substantial* change must be involved. Remember, as I defined a 'substantial' change in section 1, if a change involves the ceasing-to-be or the beginning-to-be of an individual substance, it automatically qualifies as a substantial change in my sense.

We are now in a position to give a rather more precise characterization of what a *phase* change is, for individual substances belonging to natural kinds. A change to an individual substance, *S,* of kind *K,* is a phase change for *S* just in case it is a change which things of kind *K* survive as a consequence of the natural laws of development for *K*s. It appears to be *metaphysically* possible for an individual living organism to start life as, say, a cat and yet to survive a process of transmutation which turns it into a dog. However, this wouldn't qualify as a *phase* change for that organism: it would qualify as a change of substantial kind, because contrary to the natural laws of development for cats.

I imagine that the following objection may be raised at this point. It may simply not be accepted that it is even metaphysically possible for a cat to be transmuted into a dog, for the following reason. It may be urged that the extension of the biological natural kind term 'dog' is fixed partly by evolutionary descent: that is to say, it may be urged that for a living organism to be a dog, it is not enough for it to have doglike morphological characteristics and behaviour—it must at least be the biological offspring of dogs. Consequently, it may be held that, even if it is metaphysically possible

for a cat to be transmuted into a doglike living organism, it would not thereby *become* a dog—indeed, if anything, it would remain a cat. My answer to this objection is that I do not accept the doctrine that biological natural kind terms have their extension fixed partly by evolutionary descent. What I *do* accept is that the *dog species* that exists on Earth has its *membership* fixed by evolutionary descent: no creature is a member of that species which is not the offspring of earlier members of that species. However, I do not identify species (in the biological sense) with kinds.[215] Species have *members,* whereas kinds have *instances*: species are *collectives,* whereas kinds are *universals.* It seems to me perfectly conceivable that there should be cats on a planet orbiting Alpha Centauri: they would simply not be members of *our* cat species. Consequently, even though a cat which was transmuted into a doglike creature would not thereby become a member of the Earth's dog species, I think it could still qualify as an instance of dogkind.

6. The Unavoidability of Metaphysics

Let us recall the question that we raised in section 2 above: what entitles us to regard the presence of features (1) to (4) in a change as warranting our description of that change as a phase change in one case but not in another? At least the outlines of defensible answer should by now be clear. Where a change possessing features (1) to (4) occurs to a *piece of stuff,* it leaves us with numerically the same piece of stuff. This is because the diachronic identity-conditions for pieces of stuff require only that they retain the same material content forming a spatially connected whole, irrespective of any internal reorganization of that content or change in the shape, texture, or colour of the whole mass. Consequently, the strongest reason for holding that the change is a substantial change—namely, that it involves the ceasing to be or beginning to be of an individual substance—is not available in such a case. The natural character of the change then argues in favour of our regarding it as one of phase only, not one of substantial kind. By contrast, the diachronic identity-conditions for living organisms involve no requirement of constancy of material content, but instead the requirement that a surviving organism should continue to function as an integrated and self-sustaining system. We can easily see why the latter requirement may, in conjunction with certain natural causes affecting the development of an organism, render certain irreversible

[215] Compare Hull, 'Are Species Really Individuals?', and see also the discussion in section 10 of Chapter 2 above.

changes in its structure and behaviour naturally necessary. Consequently, the irrelevance of features (1) to (4) to the question of whether a change to such an organism is a phase change is evident.

The most important thing to appreciate in all this is that we are only able to determine what constitutes a phase change for substances of a given natural kind, in the light of relevant empirical evidence, relative to a proper ontological categorization of substances of that kind—a categorization which will enable us to state the (a priori) *identity-conditions* of such substances. For we need *already* to have an adequate grasp of the conditions under which, say, a single living organism can (metaphysically) persist identically through some change in order to be in a position to decide whether such a change should be classified as a change of phase or as a change of substantial kind for that organism. Those who conflate sortal persistence-conditions with diachronic identity-conditions are unable to articulate this connection. They are consequently unable to discriminate properly between the a priori contribution of metaphysics and the a posteriori contribution of empirical science to questions of this type. What I hope to have shown is that without metaphysics (in the form of a categorial structure imposing specific identity-conditions on the instances of kinds), we could not make any sort of principled distinction between phase changes and substantial changes, no matter how much empirical evidence were made available to us. Hence, we could not explain why it wouldn't be quite as justifiable to say that tadpoles are *replaced* by frogs as that every frog was once itself a tadpole; nor why it wouldn't be quite as justifiable to say that when paper is burnt to ashes it just becomes a grey and powdery form of paper as that paper is destroyed by this process.

I have no doubt that some excessively empirically-minded philosophers would indeed relish precisely this sort of indeterminacy, holding there to be 'no fact of the matter' in such cases as to which description should be favoured. But, then, taken to its logical conclusion, this position requires one to say that there is 'no fact of the matter' as to whether *anything* persists through change or perishes: nothing to chose, objectively speaking, between Heraclitus and Spinoza. For such radical empiricists, this is all just 'metaphysics' and as such without any objective or rational basis. But my response to nihilism of this kind is to object that it is simply incoherent, in that an exponent of it, to be consistent, ought never to affirm anything as true concerning the real world. For change is an inescapable and omnipresent feature of reality: and in order to describe it we must venture to say *what* it is that changes and in what respects, in any given case of change. But saying that demands that we take a stance on what categories of objects are involved and what their identity-conditions are. To dismiss all talk of categorial structure and identity-conditions as idle metaphysical

chatter is to deprive oneself of the very conceptual materials wherewith change of any sort can be coherently described. Thus do we see illustrated the indispensable role which, as I urged in Chapter 1, metaphysics has to play in underpinning the very possibility of empirical knowledge.

9 Matter and Form

At various points in preceding chapters of this book, I have made allusion to the Aristotelian distinction between *matter* and *form,* a version of which is, I think, needed to provide a satisfactory account of the nature of *composite substances*—that is, the ordinary concrete 'things' or 'continuants' which largely populate the macroscopic world of everyday human experience. It is important, I believe, that metaphysics should find a place for such objects as genuine substances in their own right, rather than try to reduce them to complexes of non-substantial entities (such as 'tropes') or attempt to eliminate them from our ontology altogether in favour of entities of other categories (such as events). To see how this may be done, then, is the principal aim of this chapter. But although I shall be endorsing a version of the distinction between matter and form, I shall be rejecting certain features of traditional Aristotelian thinking concerning it.

1. Aristotle on Primary Substance

According to some Aristotle scholars, Aristotle changed his doctrine concerning primary substance between composing the *Categories* and composing the *Metaphysics*. By this account, the primary substances of the *Categories* are individual concrete objects or things, such as a particular horse or a particular house, whereas in the *Metaphysics* such things are deemed to be combinations of matter and substantial form and as such not themselves primary substances, the status of primary substance now being assigned to substantial forms.[216] This supposed change of doctrine is sometimes put down to the need to provide a satisfactory account of *change,* one that is consistent with the belief that nothing is ever either created from nothing or wholly annihilated. I have no intention of getting involved with questions of Aristotelian exegesis here, though I do want to

[216] See e.g. Alan Code, 'Aristotle: Essence and Accident', in R. E. Grandy and R. Warner, eds., *Philosophical Grounds of Rationality* (Oxford: Clarendon Press, 1986), and Michael Frede, 'Substance in Aristotle's *Metaphysics* ', in his *Essays in Ancient Philosophy* (Oxford: Clarendon Press, 1987).

defend the doctrine of the *Categories,* whether or not Aristotle himself later abandoned or modified it. But I also want to argue that, in a perfectly good sense, it is possible to assign the status of primary substance *both* to individual concrete objects *and* to substantial forms—because it is possible to identify items of these types. This may seem inconsistent with the idea that individual concrete objects are combinations of matter and substantial form—the theory of hylomorphism—and, indeed, it is so, at least if we understand the term 'combination' literally in this context as expressing a relation between parts of a whole. But such an understanding needs to be rejected, as we shall see when we come to discuss the notion of matter. Another problem might be thought to be that substantial forms are universals rather than particulars and hence not identifiable with individual concrete things of any kind. To this I reply that I am thinking now of *individual* substantial forms, rather than of the universals which such individuals instantiate. However, all of this will, I hope, become clear in what follows.

2. Three Concepts of Matter

Let us examine now the concept—or, more exactly, the concepts—of matter. There are at least three different concepts of matter with which we must deal, though these concepts may overlap in their extensions. All of the concepts are implicit in Aristotle's own writings, though, once more, I am not concerned here with the niceties of Aristotle scholarship. First, there is the concept of proximate matter, which is a relative notion: it is the concept of *what a thing is immediately made of.* (I take 'made of' here and throughout as being synonymous with 'composed of' and as having no implication as to the existence of a *maker*; and I use it in preference to the latter simply because it is briefer and has more currency in everyday speech.) This is a relative notion in as much as x may be immediately made of y and y may be immediately made of z, in which case x is made of z, though z is not x's proximate matter, because x is not *immediately* made of z. Of course, x may—and usually will—be immediately made of a plurality of items, as when a heap of sand is immediately made of many grains, so that our variables 'x', 'y', and 'z' here should be interpreted as having pluralities of items as well as single items as their possible values.

Our second concept of matter is the notion of a *kind of stuff,* that is, a kind of space-filling material which has separable parts capable of filling different parts of space. Matter in this sense may be either *homoeomerous* or *heteromerous,* that is, it may either be made of uniform parts of the same kind throughout its extension or else it may be made, at some level

of composition, of parts of a different kind. For example, gold, we now believe, is a heteromerous stuff, because it is made of gold atoms and these are not made of yet smaller golden parts but rather of protons, neutrons, and electrons. But even if no homoeomerous stuffs actually exist, they could have done: gold would have been a homoeomerous stuff if every part of it had been made of smaller golden parts, *ad infinitum*. Clearly, our first concept of matter may overlap in its extension with our second concept of matter: what something is immediately made of may be stuff of a certain kind. Actual examples are not hard to think of. Thus, an individual rubber ball is immediately made of rubber: that is, a part or portion of rubber is the proximate matter of the ball. My own view, I should emphasize, is that the ball is not to be *identified* with the part of rubber of which it is made, since these items very probably differ in their histories and certainly differ in their modal properties. (The part of rubber may have been synthesized before being formed into a spherical shape to create the ball; and, certainly, the part of rubber could continue to exist even if the ball were to be destroyed—for instance, if the part of rubber were to be divided into many separate pieces.) Thus, on my view, *composition is not identity*. I shall return to this claim later and defend it against a certain kind of objection.

Our third concept of matter is the notion of *material substratum*. This is the notion of an item which provides ontological support for a thing's properties—the notion of that in which a thing's properties 'inhere'. One thought behind this notion is the thought that the properties of a thing are ontologically dependent entities, which cannot exist separately from that thing. Here, it would seem, properties are themselves being thought of as *particulars,* that is, as what used to be called 'individual accidents' but are now more commonly referred to as 'tropes'.[217] My own preferred term for such items, which also has venerable precedent, is 'modes'. The thought, then, is that because modes are ontologically dependent entities, they must depend for their existence upon items of a *different* type—and material substrata are invoked as the items filling this ontological role. Various objections may, of course, be raised against this doctrine. Most obviously, it may be objected that material substrata would have themselves to be quite featureless, lacking properties of their own while 'supporting' the properties of the things whose substrata they were. The reasoning behind this objection is that if material substrata were allowed to have properties of their own, then they would stand in need of material substrata themselves in support of those properties and thus a regress would be initiated, which could only be terminated either by propertyless

[217] On tropes, see Campbell, *Abstract Particulars*.

substrata or else by substrata whose properties stood in need of no support. But if there could be substrata with properties standing in need of no support, then the motivation for introducing substrata in the first place would have been undermined, so that the substratum theory is committed to the existence of propertyless substrata in order to avoid an infinite regress which would certainly appear to be vicious.

However, the foregoing objection to substratum theory is certainly open to challenge. Remember, I introduced the notion of material substratum as the notion of an item which provides ontological support for a thing's properties. But why shouldn't we say that it is *the thing itself*—the thing which *has* the properties—which provides ontological support for those properties and which thus occupies the role of 'material substratum'? If we say this, then we are by no means committed, of course, to saying that material substrata are themselves featureless. But if we do say this, we must certainly also say that things and their properties—in the sense of their modes or individual accidents—are items belonging to quite different ontological categories, since the former are now being conceived of as being ontologically independent entities in contrast with the latter: in short, the former—the things which have the properties—are being conceived of as *individual substances*. That is precisely what I, following the Aristotle of the *Categories,* do want to say, of course. But I concede that I must earn the right to do so. Suffice it for now to say, however, that the objection to the notion of material substratum raised earlier only damages a particular version of the substratum theory.

There is another way in which some philosophers react to the objection raised earlier to the notion of material substratum. These philosophers concede that properties—or, as they prefer to call them, tropes—are ontologically dependent entities, but do not accept that this implies that they must depend for their existence upon items of a quite different type, material substrata or individual substances. They contend that tropes merely depend for their existence *upon each other,* holding at the same time that certain bundles or aggregates of interdependent tropes enjoy a kind of ontological independence, in as much as the members of such a trope-bundle do not depend for their existence upon any items outside the bundle.[218] According to this view, the items that we call individual concrete things—such as an individual apple or chair—are precisely such trope-bundles, the implication being that such things are not, after all, properly characterized as 'individual substances', at least if the latter term is intended to designate a type of item belonging to a quite different

[218] See e.g. Simons, 'Particulars in Particular Clothing'.

category from that of the tropes themselves. I shall say more about this view later.

Where have we got to so far? I have identified three different concepts of matter: the concept of proximate matter (what a thing is immediately made of), the concept of a kind of stuff, and the concept of material substratum. I have also suggested that an intelligible—and perhaps the only intelligible—interpretation of the third concept is to treat it as coinciding precisely with the notion of an individual substance, as Aristotle conceived of this in the *Categories,* that is, as coinciding with the notion of an individual concrete thing or object. Again, I have pointed out that the first concept of matter may at least overlap with the second concept, because what a thing is immediately made of may simply be stuff of a certain kind. At the same time, however, it must be acknowledged that, very often, what a thing is immediately made of is *not* stuff of a certain kind, but rather certain other things. For instance, a ship is immediately made of planks and spars and nails and ropes and so forth—and these are not themselves parts of stuff of any kind, though some of them (such as the nails) are indeed immediately made of parts of stuff of certain kinds. Modern science, of course, suggests that every macroscopic thing is *ultimately* made of microscopic things, such as quarks and electrons, rather than of parts of stuff of any kind. It also suggests that things such as quarks and electrons are themselves *not made of anything,* because they are simple or non-composite entities. If that is so, then quarks and electrons provide examples of things which, though clearly 'physical', are wholly 'immaterial', in the sense that they lack proximate matter of any kind. Against this, it might, I suppose, be urged that quarks and electrons are made of 'energy' and thus of a certain kind of stuff. But this would almost certainly seem to involve a serious misconception of the nature of energy.

3. The Notion of Form

Next I want to look at the notion of *form,* which in Aristotle's *Metaphysics* seems to be treated as correlative with that of matter—though again I should issue the warning that I do not wish to engage here in the disputes of rival Aristotle scholars. The doctrine of hylomorphism seems to be that every individual concrete thing is, in some sense, a 'combination' of matter and form. A standard example is that of a bronze statue, whose matter is bronze and whose form (it seems) is a certain shape imposed upon that bronze. Here it appears that it is the notion of *proximate* matter that is being invoked as correlative with the notion of form. Aristotle himself, it seems clear, believed in the existence of homoeomerous stuffs, because

he was opposed to atomism. He also seems to have believed that all such stuffs somehow arose from the presence within them, in different proportions or ratios, of the four supposed elements—fire, air, earth, and water. This aspect of his doctrine does not now much concern me, interesting though it may be to try to make sense of it.[219] Of equally small concern to me is the question of whether or not someone, like Aristotle, who believes in the existence of homoeomerous stuffs, is committed to the existence of so-called 'prime matter'—and indeed the deeper question of whether the notion of prime matter makes sense. I did not identify the notion of prime matter as a fourth concept of matter distinct from any of the previous three, because it is clearly a special case of the concept of matter as stuff of a certain kind (the second concept). At the same time, however, it does seem that some philosophers have been inclined to identify the notion of prime matter with that of material substratum, though only those wedded to the version of the substratum theory which I have rejected, that is, the version according to which material substratum is itself featureless. Indeed, some philosophers seem to suggest, rather darkly, that this supposed identity between prime matter and 'featureless' material substratum might somehow receive support from the idea that prime matter has only 'potential', as opposed to 'actual', existence. However, all such thoughts are too opaque for me and I shall consider them no further here. I only want to say that it seems to me perfectly intelligible to suppose, first, that homoeomerous stuffs *might* have existed and, second, that there might have been just *one* fundamental kind of homoeomerous stuff to which all parts of stuff belonged. If the latter had been the case, it would still have been possible for different parts of stuff to be qualitatively different from one another, but nothing would have warranted our calling this single kind of stuff 'prime matter', if by that is meant a kind of stuff the parts of which supposedly have *no qualities whatever*. For I can make no sense of the idea of such a featureless kind of stuff.

But we must return to the issue of form. The hylomorphic theory, it seems, conceives of a thing's form as the way in which its proximate matter has to be organised or arranged in order for a thing of that kind, made of that matter, to exist. Thus, a piece of bronze has to be shaped in a certain way in order for a statue, made of that bronze, to exist. In what sense, then, if any, is a particular bronze statue a 'combination' of matter and form? Not, I think, in any mereological sense.[220] The piece of bronze composing

[219] See e.g. Kit Fine, 'The Problem of Mixture', in F. A. Lewis and R. Bolton, eds., *Form, Matter, and Mixture in Aristotle* (Oxford: Blackwell, 1996).

[220] For a contrary view to mine, see Sally Haslanger, 'Parts, Compounds and Substantial Unity', in T. Scaltsas, D. Charles, and M. L. Gill, eds., *Unity, Identity and Explanation in Aristotle's Metaphysics* (Oxford: Clarendon Press, 1994).

a statue is not a *part* of the statue. For it could only be a part of the statue if it were either a proper or an improper part of it (an improper part of a whole being a part of it which overlaps every part of it). It is not the latter (an improper part), because then it would be *identical* with the statue, which I have already claimed it is not. Nor, however, is it the former (a proper part), for there is no part of the statue which it fails to overlap. (To concede, thus, that it overlaps every part of the statue is not to concede that it is, after all, an improper part of the statue, because it is not yet to concede that it is a part of the statue at all.) Nor is the form of the statue a part of it, since it is, rather, the way in which the statue's various material parts are organized or arranged (or so we are presently assuming)—and the arrangement of certain parts cannot itself be one of those parts, as this would involve the very conception of an arrangement of parts in a fatal kind of impredicativity. Talk, then, of matter and form 'combining' must be explicated in another way if it is to make any sense at all. My own view is that such talk is not, ultimately, very helpful and only tends to lead philosophers astray.

As I have already indicated, it is at least superficially plausible to think of a thing's form, such as the form of a statue, as being a *way*—thus, in the case of the statue, a way in which its proximate matter, the bronze, is shaped. (I should warn, however, that we shall soon see reason to modify this particular judgement concerning the form of the statue, while retaining aspects of the more general insight that talk of 'ways' provides.) Such a 'way' is nothing other than what I earlier called a *mode,* as indeed the words themselves suggest. So what we are talking about here are particular properties, or property instances. (I shall, for the time being, avoid the terminology of 'tropes'.) These are to be contrasted with *universals,* conceived of as the *types* of which property instances or modes are tokens. I myself favour a rather liberal ontology which embraces both universals and particulars, though I shall not undertake to defend that stance just now. For present purposes, my chief focus is on particulars. Now, however, we immediately run into what appears to be a difficulty. I have suggested (though only provisionally) that the 'form' of the statue is the particular way in which the bronze composing it is shaped, and that this particular 'way' is a mode or property instance. But *of what* is it a property—the bronze, or the statue, or both? We are under some pressure to say that the form belongs to the statue rather than to the bronze (perhaps because the hylomorphic theory tells us that the statue is a 'combination' of matter and form, that is, of the bronze and a certain shape, though I shall identify a better reason than this shortly). But the bronze and the statue, while the former composes the latter, are exactly the same in shape. Do they, then, have numerically distinct but exactly coinciding shapes, with the

shape of the statue being its 'form' while the shape of the bronze is, as some might put it, a mere 'accident' of the bronze? The thought here would be that the statue's shape is essential to it, whereas the bronze's shape is non-essential. However, the notion that two distinct but qualitatively indistinguishable shapes could exactly coincide is highly contentious, raising a host of metaphysical issues. Rather than address those issues just now, I shall return to this question later, when I come to discuss trope theory.

If we are to regard the 'form' of the statue as something belonging exclusively to the statue *rather than* to the bronze, we do well, it seems, to identify that form with a particular property which the statue has but the bronze does not. There is such a property, of course: the property of *being a statue of such-and-such a shape*. Put this way, however, we may seem to be talking of that property as a *universal* rather than a *particular*. After all, many different individual statues, it might be said, can have the property of being a statue of such-and-such a shape. But if we follow my earlier suggestion and acknowledge the existence of properties *both* in the sense of universals *and* in the sense of particulars—that is, in the sense of particular property instances—then we may want to say that each individual statue has a *particular* property of being a statue of such-and-such a shape, just as it has a particular shape or colour. In fact, though, I suggest that what we *should* say is that each individual statue doesn't *have,* but *is,* a particular instance of the universal '(being a) statue of such-and-such a shape'. This is because (as in Chapters 7 and 8) I want to distinguish between two different types of universal: *substantial* universals and *non-substantial* universals. In general, the former are denoted by *sortal* terms, such as 'statue' and 'tiger', whereas the latter are denoted by *adjectival* terms, such as 'red' and 'spherical'. The particular instances of such non-substantial universals are what I earlier called *modes*—and these are ontologically dependent entities, depending for their existence upon the individual concrete things whose modes they are. The particular instances of substantial universals, however, are just the individual concrete things themselves, such as particular statues and particular tigers. So the position that I am recommending is this. If we want to make sense of the distinction between matter and form—where by 'matter', now, we understand *proximate* matter—then we do well to *identify* an individual concrete thing with its own particular 'substantial form'. This, then, will enable us to accept *both* Aristotle's view of the *Categories* that individual concrete things are the primary substances *and* the view, sometimes attributed to Aristotle on the basis of what he says in the *Metaphysics,* that particular substantial forms are the primary substances. For, according to my suggestion, these two doctrines exactly coincide.

The position we have arrived at implies, of course, that it is not, after all, the particular *shape* of the statue which is its 'form', but rather, as it were, the statue's particular *being a statue of such a shape*—something which, as we have seen, I want simply to identify with *the statue itself*. And, surely, it *must* be the statue's particular *being a statue of such a shape,* rather than just its particular *shape,* which is its 'form', if we take it (as I think we must) that a thing's form determines its identity over time. For the statue's merely having that particular shape does not, as such, constrain its identity over time at all, whereas its being a *statue* of that shape most certainly does, because a statue cannot change its shape (unlike a piece of bronze).

4. Composition Is not Identity

This is an appropriate place to observe, concerning my claim that *composition is not identity,* that some philosophers find it surprisingly difficult to understand how two different things, with different persistence conditions—such as the bronze statue and the piece of bronze composing it—can exist in the same place at the same time.[221] They point out that these things have exactly the same components while they coincide—in this case, a certain set of bronze particles—and they cannot understand how these same components can simultaneously compose two different objects with different modal properties, for they assume that the modal properties of a composite object must supervene upon the properties and relations of its components. (Here it should be noted that a thing's persistence-conditions qualify as modal properties of that thing, for they determine what kinds of change that thing can and cannot survive. I ought to add, in view of the position developed in Chapter 8, that I am here talking about a thing's *individual* persistence-conditions, as specified by its criterion of diachronic identity, rather than about what I there called *sortal* persistence-conditions.)

However, these philosophers apparently fail to grasp two vital points. The first is that whether or not a persisting object of a certain kind exists in a certain place at a certain time is not in general determined purely by facts concerning what else exists *at that time,* but typically also depends on facts concerning what else exists *before and after that time* and how

[221] See e.g. Michael B. Burke, 'Copper Statues and Pieces of Copper', *Analysis,* 52 (1992), 12–17, Zimmerman, 'Theories of Masses and Problems of Constitution', and Eric T. Olson, 'Composition and Coincidence', *Pacific Philosophical Quarterly,* 77 (1996), 374–403. For further discussion, see my 'Coinciding Objects', *Analysis,* 55 (1995), 171–8, and Samuel Levey, 'Coincidence and Principles of Composition', *Analysis,* 57 (1997), 1–10.

those other things are related *over* time. The second is that it is in virtue of *different* transtemporal relations between their components that composite things of different kinds persist through time. Thus, what is required for a piece of bronze to persist is that the *same* bronze particles should remain united together over time, whereas what is required for a bronze statue to persist is that *some* (but not necessarily the same) bronze particles should be successively united together so as to preserve the same overall shape. (These requirements, I should add, are of an a priori character, and the modal properties associated with them are consequently quite unlike ordinary dispositional properties, such as solubility: for instance, those modal properties are not 'grounded', as solubility is commonly thought to be, in categorical properties of a thing's microstructural constituents.)

If one takes, as it were, a mental snapshot of the bronze statue as it is at a certain moment of time, then, of course, one will not perceive any discernible difference between it and the piece of bronze composing it at that time. But, equally, if one takes a mental snapshot of a *moving* object at a moment of time, one will not perceive any discernible difference between it and an otherwise exactly similar stationary object. This just goes to show, unsurprisingly, that statuehood, like motion, is a 'diachronic' property, whose exemplification at a time is underdetermined by purely synchronic facts concerning things existing at that time.

5. Form Without Matter

Our current position has some other interesting and, perhaps, genuinely surprising implications. One of these is that, contrary to the doctrine of hylomorphism, the notions of form and matter, far from being correlative, are relatively independent. There is nothing absurd in the notion of *form without matter*. Of course, we have already noted that modern science apparently acknowledges the existence of individual concrete things which are 'matterless', in the sense of having no proximate matter: the fundamental particles of modern physics are not conceived of as being 'made of' (that is, composed of) anything whatever. But, according to the conception of 'form' which I am advocating, this does not constrain us to deny that such particles have *form*. Each such particle may, consistently with what I have said so far, be taken simply to *be* (identical with) a particular 'substantial form'. Thus, a particular electron could be taken simply to be a particular instance of the substantial universal '(being an) electron'. In fact, the only thing which stands in the way of our saying this is that it appears that electrons and other so-called fundamental particles

do not possess fully determinate identity-conditions, owing to the quantum-mechanical phenomenon of superposition or 'entanglement' (as we saw in Chapter 3). It may be, indeed, that a field interpretation of quantum processes is ultimately preferable to a particle interpretation, in which case we shouldn't think of 'electron' as a sortal term at all. But these are issues which I do not wish to go into here. Suffice it to say that the concept of a matterless individual substance is perfectly coherent, even if physics does not provide us with uncontentious examples of such items.

This idea of individual substances possessing form without matter is not at all novel, of course. Leibnizian monads would seem to fit this description exactly, as would Cartesian souls. (The vulgar notion, propagated by some modern physicalist philosophers, that Cartesian souls are supposed to made of some sort of ghostly, 'immaterial' stuff—a near contradiction in terms—is quite unwarranted.) However, I imagine that these historical comparisons may immediately ring alarm bells in some philosophers' minds. In particular, worries may arise concerning the *individuation* of entities of the sort we are contemplating. One venerable tradition—exemplified in the writings of Aquinas—has it that matter is 'the principle of individuation'. Here the thought is that all that can be guaranteed to distinguish two different concrete things of exactly the same kind—two different tigers, say—is the different matter of which they are composed. Hence, matterless kinds of things would admit of no principled differentiation into numerically distinct instances of those kinds. Thus, it seems, Aquinas took the view that angels, being immaterial beings, could only differ *specifically,* not merely *numerically,* from one another, which implies that each angel is an *infima species*—a lowest species—rather than a particular instance of a species. Leibniz, famously, extended this conclusion to all substances, in line with his doctrine of the identity of indiscernibles.[222]

On these questions, however, I depart from traditional thinking. (In what follows, I should point out, I shall not distinguish between matter conceived of as a kind of stuff and matter conceived of as what a thing is made of, because it seems that Aquinas and Leibniz themselves were not laying any weight on this distinction in connection with the issues now under debate.) First of all, I think it important to distinguish very carefully between questions of identity and questions of individuation (as I explained in Chapter 3). A principle of individuation, as I understand that term, is a principle which tells us what is to count as *one* instance of a given kind—for example, what is to count as one tiger or one ship. A criterion of identity, by contrast, is a principle which tells us what makes for the

[222] See G. W. Leibniz, *Discourse on Metaphysics,* trans. P. G. Lucas and L. Grint (Manchester: Manchester University Press, 1953), 14.

identity or diversity of items of a given kind—for example, what makes for the identity or diversity of this ship with that ship. As a consequence, it seems to me that matter is certainly *not* a 'principle of individuation' of individual concrete things (things like tigers and ships): on the contrary, their *form* is what 'individuates' such things. For it is the form of a tiger which determines its status as being a *single* thing of a certain kind, a *unitary whole* composed of suitably organized parts. Indeed, one feature which distinguishes individual concrete things, such as individual tigers, from mere parts or portions of material stuff, is that the latter *lack* any distinctive principle of individuation. This is why we cannot *count* parts of material stuff in any principled way—why, for instance, it makes no sense to ask *how many* parts or portions of gold there are in a certain room, but at most only *how much* gold is there altogether. Parts of material stuff precisely *fail* to have any distinctive form of their own, since such a part can receive any shape whatever and be dispersed into separate bits or be gathered together into a lump. Moreover, every part of material stuff (or at least every such part of macroscopic size, in the case of heteromerous stuffs) consists of lesser parts of the same stuff, since every such part is indefinitely further divisible in indefinitely many different ways. Parts of material stuff can at best only be individuated derivatively, in relation to individual concrete things which they may happen to compose. For example, a part of gold might be singled out as the gold which currently wholly composes a certain individual gold ring.

Might it then be that matter, rather than being the 'principle of individuation' of individual concrete things, provides a criterion of *identity* for them? Indeed, is not this really what is meant by the doctrine described above as being attributable to Aquinas? The idea, then, is that what makes for the numerical distinctness or diversity (non-identity) of two different tigers, say, is the numerical distinctness of the matter composing them. But this idea can certainly be challenged, on the simple grounds that individual concrete things like tigers can and do *change* their component matter. Indeed, in principle, two different tigers could, over a period of time, entirely exchange their component matter with one another. So the most that can be said is that two different tigers cannot share the same matter *at the same time*. But why not? Simply because that would require the two tigers to exist in exactly the same place at the same time, which we deem to be impossible. However, then it transpires that what really makes for the diversity of our two tigers is their difference in space-time location, from which their difference in component matter at any time merely follows as a consequence. Moreover, that tigers are differentiated by their space-time locations is clearly itself a consequence of their *form,* since it has to do with what *kind* of thing they are. (Recall, indeed, my earlier remarks to the

effect that it is form which determines a thing's identity over time.) This is brought out by the fact that certain (different) kinds of entity apparently can exist in the same place at the same time, such as a rubber ball and the piece of rubber composing it, for this highlights the fact that the mutual exclusion of different tigers from the same place at the same time is simply a consequence of their being things of the *same substantial kind*.[223] I conclude, then, that matter provides neither a principle of individuation nor a criterion of identity for individual concrete things: their form alone provides both. In consequence, there is nothing inherently problematic about the notion of individual concrete things which are 'matterless': that is to say, their lacking matter need in no way compromise either the individuability or the identity of such entities. (This applies, I should say, whether or not we think of 'matter' in this context as a kind of stuff or merely as what something is made of.) This is not to say there there are no problems whatever concerning the individuation and identity of such entities, only that there are none which accrue simply from the fact that they are conceived to be 'matterless'.

Another misconception which we should dispose of is the idea that matterless individuals would have to be *extensionless* and so either punctiform or else altogether non-spatial. This idea is based, perhaps, on the thought that any spatially extended object must at least contain spatially distinct parts and consequently, if those parts are to be distinguishable from mere parts of space itself, they must be distinct *material* parts of the object. But this is to confuse the notion of a spatial part of a thing with that of a component or material part of it (in the sense of 'material' which corresponds to the concept of matter as what a thing is made of). Even when a spatially extended thing does have material parts, they are never to be identified with spatial parts of that thing (as I pointed out in Chapter 7). For instance, the top half of a rubber ball is not to be identified with the portion of rubber currently occupying that top half, not least because, through a rearrangement of the material of the ball, a different portion of rubber could come to occupy that top half. There is no reason why there should not exist a spatially extended individual concrete thing which was not composed of anything at all, neither of parts of stuff nor of other individual concrete things (just as an electron is, in this sense, non-composite). In particular, there need be no problem about distinguishing such a spatially extended individual from the region of space which it occupies,

[223] See further David S. Oderberg, 'Coincidence under a Sortal', *Philosophical Review,* 105 (1996), 145–71. I disagree, then, with the claims of Christopher Hughes, 'Same-Kind Coincidence and the Ship of Theseus', *Mind,* 106 (1997), 53–67. See also my earlier discussion of such issues in Chapter 5 above.

because it may have *qualities and powers* which that region of space lacks—and while retaining those qualities and powers it may trace a path through space by successively occupying different regions of space. So, once we recognize that a spatially extended thing, although possessing spatial parts, is certainly not composed of those parts, even if it is composed of anything at all, we can see that there is nothing problematic about the notion of a non-composite or simple thing which is none the less spatially extended.[224] Whether there are any actual examples of such things is a more contentious issue. I hesitate to offer the example of fundamental physical particles, not only because (as remarked earlier) a field interpretation of quantum phenomena may ultimately be preferable to a particle interpretation, but also because, even on a particle interpretation, it is questionable whether such particles can be said to be spatially extended in any very straightforward sense. However, elsewhere I have offered the example of *persons* as very possibly being things which are non-composite and yet which are also (at least when embodied) spatially extended.[225] The thought behind this suggestion is that a person is not *composed* by his or her body, nor by any material parts thereof: the relation of embodiment is, I think, quite different from that of composition. But I shall say no more about this here.

6. The Four-Category Ontology and Its Rivals

I have, of course, been defending a substance ontology, in which individual concrete things are—as they were for the Aristotle of the *Categories*—the primary substances. My ontology also admits both universals and particulars: substantial universals, whose particular instances are individual concrete things, and non-substantial universals, whose particular instances are *modes* of those individual concrete things. (I should say that I also admit *relations,* both as universals and as particulars, but to avoid unnecessary complication I shall say no more about these here.) Such a four-category ontology may seem extravagant to many metaphysicians, but I think I can justify it. The case for realism about universals does not really concern me just here, though I would base it on the need to explain the status of natural laws.[226] Of more immediate concern to me

[224] Here I disagree with Dean W. Zimmerman, 'Could Extended Objects be Made Out of Simple Parts? An Argument for "Atomless Gunk"', *Philosophy and Phenomenological Research,* 56 (1996), 1–29: see, especially, p. 8.

[225] See my *Subjects of Experience,* 39–44, and also Chapter 7 above.

[226] See further my *Kinds of Being,* ch. 8.

now is the question of why we should admit to our ontology, as belonging to irreducibly different categories, both individual substances and their modes. In this respect my ontology has two distinct rivals: on the one hand an ontology which admits, as particulars, only individual substances (what I have hitherto called individual concrete things) and on the other hand an ontology which admits, as particulars, only modes—or, as its adherents commonly prefer to call them, tropes.

I should point out, incidentally, that in describing my ontology as a 'four-category' ontology I am prescinding from certain ontological distinctions given prominence in other chapters of this book, whose mention here would only introduce distracting complications: hence the slight departure in this chapter from the categorial scheme depicted in Figure 1 of Chapter 8—where, for instance, various categories of non-substance other than modes were recognized. But, in any case, as I mentioned in Chapter 8, there is often more than one way to organize what is in effect the same categorial scheme, just as there are different axiomatizations of the same system of geometry.

7. Against an Ontology of Substances Without Modes

Let us first look at the ontology which admits, as particulars, only individual substances. Such an ontology will not find it easy to do without universals, because there are seemingly intractable difficulties besetting any attempt to combine such an ontology with a doctrine of resemblance nominalism. But such an ontology, if it admits universals, cannot make a principled distinction between what I have called substantial and non-substantial universals (that is, between what I called, in Chapter 8, 'kind-universals' and 'property-universals'). It cannot distinguish, in any very fundamental way, between saying that an individual substance is a *ball* or a *leaf* and saying that it is *round* or *green*. In both cases, it must represent such a state of affairs as one in which an individual substance instantiates a certain universal. But to me it seems plainly mistaken to say that an individual leaf, say, is an *instance* of the universal green: rather, I should say that the leaf *exemplifies* that universal, but only in the sense that it possesses a particular property or mode which—unlike the leaf itself—*is* an instance of the universal green.

However, I do not expect this consideration to weigh very heavily with the devotees of the ontology now under scrutiny—indeed, they may count it a virtue of their position that it accords no special status to substantial

kinds.[227] What are they to say, though, about the phenomenology of object-perception? When I see a green leaf, do I not see the very greenness of the leaf, rather than just the leaf itself? To this advocates of the theory may reply that they conceive of universals in an 'Aristotelian' fashion, as existing *in re* or 'immanently', so that greenness (the universal) is, as the popular phrase has it, 'wholly present' in each individual green thing. So, on this view, I *do* see the greenness of the leaf, but what I see is not a *particular* greenness but just the universal, which is 'wholly present' in the leaf (but is also 'wholly present' in other, spatially separate things). But here I protest for the following reason: when I see the leaf *change* in colour—perhaps as it is turned brown by a flame—I seem to see something *cease to exist* in the location of the leaf, namely, its greenness. But it could not be the *universal* greenness which ceases to exist, at least so long as other green things continue to exist. My opponent must say that really what I see is not something ceasing to exist, but merely the leaf's ceasing to instantiate greenness, or greenness ceasing to be 'wholly present' just here. I can only say that that suggestion strikes me as being quite false to the phenomenology of perception. The objects of perception seem, one and all, to be *particulars*—and, indeed, a causal theory of perception (which I myself favour) would appear to require this, since particulars alone seem capable of entering into causal relations. (I should add that, if my argument of Chapter 7 against the existence of concrete universals is correct, then the universal greenness cannot literally be *located* where a green leaf is and so cannot be something *seen* to be there: in which case, what *is* seen to be there must instead be the leaf's *particular* greenness.)

8. Against the Trope Ontology

Let us turn, then, to the trope ontology, which I consider to be a more serious rival to my own. As I remarked earlier, the trope ontologist accepts, in a way, that tropes are ontologically dependent entities, but tries to do without the category of individual substance by arguing that tropes depend on *each other* for their existence, rather than upon substances (conceived as items belonging to a distinct ontological category). What I have been calling 'individual concrete things' and have regarded as being individual substances, the trope ontologist regards as 'bundles' of interdependent and spatiotemporally compresent tropes. As I see it, the most serious problem for the trope ontologist is to provide an adequate account

[227] See e.g. D. M. Armstrong, *A World of States of Affairs* (Cambridge: Cambridge University Press, 1997), 65–8.

of the *identity*-conditions of tropes, while simultaneously acknowledging their ontologically dependent nature. The trope ontologist is faced, I believe, with a dilemma in this connection, as I shall now try to make clear. (Some aspects of this problem were examined in Chapter 3, but here I shall approach it with a slightly different focus, having principally in view the rivalry between a substance ontology and a trope ontology.)

What determines the identity of a trope, such as the redness of a certain red rubber ball? Clearly, the rednesses of two different red rubber balls are numerically distinct rednesses, but what makes them so? One might venture to say that the distinctness of the two rednesses—the two red tropes—is a simple consequence of the distinctness of the two balls to which they respectively belong. This is to invoke the principle that the identity of a trope is determined at least in part by the identity of the thing to which it belongs: in short, it is to say that tropes are *identity-dependent* upon their possessors (invoking, here, the concept of identity-dependence developed in Chapter 6). However, it is difficult to square this claim with the thesis that the possessors of tropes—the 'things' to which they belong, such as a rubber ball—are themselves just bundles of tropes. For, whatever exactly is meant by 'bundle' in this context, it seems clear that a bundle of tropes must in fact be identity-dependent upon the tropes of which it is a bundle. Indeed, only if this is accepted, it seems to me, can the trope ontologist fairly claim to be doing away with an independent ontological category of individual substance. But, pretty clearly, to hold *both* that tropes are identity-dependent upon trope-bundles *and* that trope-bundles are identity-dependent upon their constituent tropes is to fall into a fatal circularity which deprives both tropes and trope-bundles of well-defined identity-conditions altogether.

Incidentally, these remarks are not compromised in any way by the fact that, according to any trope theory which is able to cope with the *changeableness* of persisting things, such things will in fact have to be identified, more precisely, either with *sequences* of distinct trope-bundles or else with 'bundles' of tropes which are themselves conceived of as being capable of surviving a change in their membership. On the first of these proposals, according to which a trope-bundle has a fixed membership, a trope-bundle will quite evidently be identity-dependent upon its constituent tropes. But even on the second proposal, a particular trope-bundle will still only be identifiable as the bundle which has contained such-and-such tropes as its members during its career and so will still be identity-dependent upon its constituent tropes, albeit not just upon the tropes which are its members at any one time. For to deny this would be to elevate 'trope-bundles' to the status of individual substances in their own right by giving them ontological priority over their constituents, thereby conceding victory to the

substance ontologist (and making the very term 'trope-bundle' inappropriate).

Evidently, then, the trope theorist must deny that tropes are identity-dependent upon their possessors. But now the theorist needs to explain in what sense tropes are really ontologically dependent entities—why it is, for instance, that a certain trope cannot 'float free' of the trope-bundle to which it belongs and migrate to another bundle. The identity-dependence of a trope upon its possessor would certainly seem to be capable of explaining this, but we have already seen that the trope theorist cannot appeal to any such dependence, given that the possessors of tropes are conceived of as being mere trope-bundles. The trope theorist may indeed urge that certain *kinds* of tropes cannot exist save in combination with those of certain other kinds—for instance, that wherever a colour trope exists, it must exist in combination with (that is, be 'compresent' with) a shape trope. The theorist may contend that such necessities derive from fundamental natural laws governing the existence of tropes and thereby hope to explain why it is, for example, that we never encounter a 'free-floating' red trope. Perhaps, in this respect, tropes are rather like the quarks of the standard model of particle physics. (Quarks can apparently only exist in combinations of two or three within other composite particles, such as protons, never on their own—though some attempts to detect 'free' quarks have been made.) However, none of this delivers the consequence that the redness of a particular red rubber ball cannot survive the demise of that ball or migrate to another thing altogether: it would seem to be perfectly free to do so, so long as it is always accompanied by other tropes of suitable kinds. And yet the suggestion that this might happen seems manifestly absurd.

Another difficulty is this: if tropes are not identity-dependent upon their possessors, what does determine their identity or diversity? Perhaps it will be suggested that their space-time location determines this, but that immediately raises a problem, since tropes are supposed to be capable of existing 'compresently' with other tropes—that is, in the same space-time location. To this it might be replied that tropes only exclude other tropes *of the same kind* from their space-time location, so that two distinct rednesses or roundnesses cannot exactly coincide. But why not? Indeed, it would seem that there are examples which invite the trope theorist to say that two tropes of the same kind *can* exactly coincide. For instance, what is one to say about the roundness tropes of a round ball and a round cavity which it exactly fits? Suppose the round ball fits snugly into a cavity in a piece of plaster which has been moulded around the ball. Both the ball and the piece of plaster are, according to the trope-theorist, trope-bundles, each of which contains a roundness trope. Do they contain the

same roundness trope, however, or do they contain numerically distinct but exactly similar and coinciding roundness tropes? I think that the trope theorist had better say that they contain numerically distinct roundness tropes, since either the ball or the piece of plaster can be destroyed while leaving the other completely intact. Other examples like this are not difficult to think of. (We met one earlier, when we discussed the case of the shape of the bronze statue and the exactly similar shape of the bronze composing the statue.) But the implication of such examples is that the trope theorist had better not say that tropes exclude other tropes of the same kind from their space-time location and consequently must concede that trope-identity has to be determined in some other way. But no other way seems available.

Nor can the trope theorist afford to say that it simply doesn't matter how trope identity is determined, or even whether tropes *have* determinate identity at all—though it is open to *me* to say this about 'modes', at least in some instances (as indeed I do in Chapter 3). For if the possessors of tropes—things like rubber balls and leaves—are just trope-bundles, then *their* identity will depend upon the identity of the tropes they contain, as we have already noted: and the trope theorist cannot afford to say that the identity of such items is itself a matter of no consequence or something indeterminate. I simply do not see a way out of this problem for the trope theorist. By contrast, the substance ontology is relatively problem-free. According to this ontology, individual concrete things, such as rubber balls and leaves, are deemed to be individual substances and as such ontologically independent entities (in the sense more precisely explained in Chapter 6). The identity-conditions of individual substances are determined by their form and so may differ for substances of different substantial kinds (as we saw in Chapters 7 and 8). There is no reason, then, either to expect or to demand a uniform account of the identity-conditions of all individual substances: rather, we must proceed on a case-by-case basis. As for modes—as I call particular properties, in preference to calling them tropes—these are conceived as being particular 'ways' individual substances are, such as the particular way in which a ball is shaped or coloured. Thus understood, the ontological dependence of modes upon the substances which possess them is immediately apparent. Modes aren't 'things' or 'objects' which are somehow related to substances, let alone items of which other items, such as rubber balls, are composed. Rather, to speak of a mode of a substance is just to speak of *how* that substance is, in a certain respect. Another way to put this is to say that modes are 'adjectival' upon substances. Consequently, any talk of modes 'migrating' from one substance to another can be seen as involving an absurd category mistake, whereby modes are treated as if they were quasi-substances

in their own right. By the same token, the trope theorist's thesis that things such as rubber balls and leaves are 'bundles' of tropes can be seen as involving a confusion between properties and parts. A particular redness is not a *part* of a red rubber ball, as the trope theorist would have it—not even a 'dependent part'—but is, rather, something *predicable* of the ball.

9. Concluding Remarks

To conclude: I have defended a particular kind of substance ontology, one which is consonant with Aristotle's doctrine in the *Categories* but also consistent with certain aspects of his doctrine in the *Metaphysics*. I reject, however, the doctrine of hylomorphism (understood as implying that every individual concrete thing is a combination of matter and form) as well as the doctrines of 'prime matter' and material substratum, the latter at least in that version of it which sees material substratum as a featureless entity distinct from the thing whose properties it 'supports'.[228] An important aspect of my position is my identification of individual substances with instances of substantial universals, which can be seen as tantamount to identifying an individual substance with a particular 'substantial form'. According to this view of substantial form, the notion of form is not inseparably linked to the notion of matter, neither to the notion of matter as a kind of stuff nor to the notion of matter as what a thing is made of. Consequently, it makes perfect sense on this view to contemplate the possibility of there being 'matterless' substances—form without matter—a possibility which may actually be realized in the case of the fundamental particles of physics and even in the case of individual persons, that is, *ourselves*.

[228] For a conception of substratum quite close to my own, see C. B. Martin, 'Substance Substantiated', *Australasian Journal of Philosophy*, 58 (1980), 3–10. Martin's conception of particular properties is also close to my own, though he differs from me in being no friend of universals.

10 Abstract Entities

In Chapter 2 I drew a distinction, amongst entities in general, between *objects* and *non-objects*—the former having as their hallmark their possession of determinate identity-conditions. In that chapter I also gave an account of the distinction between *abstract* and *concrete* entities which was formulated in spatiotemporal terms, with abstract entities being characterized as existing in neither space nor time and consequently lacking spatiotemporal properties and relations. Now, many traditional candidates for the status of 'abstract objects' have been attacked (under the war-cry 'No entity without identity') precisely because they seem to *lack* determinate identity-conditions—propositions and properties providing notorious examples. But I would contend that their supposed lack of determinate identity-conditions is not a good reason for denying the existence of such entities and is at most a reason for denying them the status of 'objects'. A further complication, however, is this: as I shall very shortly make clear, there are in fact several different senses in which entities have been thought of as being 'abstract', of which the sense in which propositions, numbers, and sets are 'abstract'—the sense I focused on in Chapter 2—is only one. In the case of properties, which sense of 'abstract' is appropriate depends on whether one is thinking of properties as universals or as particulars, at least as far as the properties of concrete, physical objects are concerned.

But why should we believe in the existence of abstract entities of *any* kind? My answer is that we should do so if and only if the postulation of their existence is explanatorily fruitful—though this poses the further question of *how* the existence of abstract entities could explain anything. In this chapter, I shall examine this issue with special reference to universals. Later I shall go on to discuss the nature of mathematical objects, especially sets and numbers. My view is that numbers are in fact themselves universals, being kinds of sets (that is, kinds whose particular instances are individual sets of appropriate cardinality). Correspondingly, I favour an account of sets which sees them precisely as being instances of numbers, thereby avoiding the unhelpful metaphor which speaks of a set as being a 'collection' of things. Thus mine is the reverse of the common

view which seeks to explain the notion of number in terms of the notion of set.

1. Three Different Conceptions of Abstractness

In contemporary discussions of abstract entities, we can find at least three different conceptions of abstractness at work. On the first conception—which I focused upon in Chapter 2—the term 'abstract' is used in opposition to the term 'concrete', with concrete entities being thought of as existing in space and time (or at least in time), while abstract entities are correspondingly thought of as being non-spatiotemporal in character.[229]Let us call abstract entities in this first sense 'abstract1' entities. They would standardly be taken to include such items as *numbers* and *universals*.

On the second conception, an abstract entity is conceived of as one logically incapable of enjoying a 'separate' existence—separate, that is, from some other entity or entities—even though it may be separated 'in thought' from that entity or those entities.[230] (Such separation 'in thought'—a psychological process—seems to be what such philosophers as Locke understood by 'abstraction'; but in calling the entities thus separated 'abstract', we are now invoking a *metaphysical* distinction, defined in terms of the impossibility of their separate *existence*.) Thus, for example, what I have elsewhere called *modes*—such as the particular shape and colour of an individual apple—come into this category. One can separate 'in thought' the apple's colour from its other features, but an apple's colour cannot *exist* independently of the existence of other features of it, nor, indeed, independently of the existence of the apple as a whole. (The notion of such existential or ontological dependency was, of course, extensively discussed in Chapter 6 above.) I shall call abstract entities in this second sense 'abstract2' entities.

Finally, we have the third conception, according to which (what I shall call) 'abstract3' entities are, as I shall explain more fully in due course, entities which are conceived of as being introduced by way of *abstraction from concepts,* according to Fregean abstraction principles.[231] A paradigm example would be Fregean *extensions* (of concepts), purportedly introduced

[229] See e.g. Grossmann, *The Existence of the World,* 7.

[230] See e.g. Campbell, *Abstract Particulars,* 2–3.

[231] For the background to this approach, which owes much to the work of Michael Dummett, see the discussion in Hale, *Abstract Objects,* ch. 3.

by Frege's fatal Basic Law V of the *Grundgesetze*. The three different conceptions of abstract entities cut across each other in various ways; and each has its own problems, as we shall see.

So far I have deliberately spoken only of abstract entities rather than of abstract *objects*. On my view of what qualifies as an 'object', an abstract object—in any of the three senses of 'abstract' just mentioned—will at least have to be an entity possessing determinate identity-conditions. Thus, by my account, *modes* are not abstract2 *objects,* because they lack such conditions (as I explained in Chapter 3). This view contrasts with that of today's growing army of *trope* theorists, who speak of tropes as 'abstract particulars' and regard individual substances (such as a particular apple) as bundles of compresent tropes—particular colours, shapes, weights and so forth.[232] My objection—as I tried to make clear in Chapter 9—is not so much to the claim that such abstract2 entities exist, but to the supposition that they are *objects* and indeed ones ontologically more basic than things like apples.

2. Abstract Versus Concrete

Let us, however, return to the first conception of abstractness, which contrasts it with concreteness. As I have indicated, this contrast is normally drawn in spatiotemporal terms, with abstract1 entities being characterized as not existing 'in' space and time.[233] But what does it *mean* so to characterize them? How *could* an object exist 'outside' space and time? ('Outside' is a spatial preposition, so that this way of talking can at best be metaphorical.) I do not think there is any very deep problem here, however. To exist *in* space and time is not to have a special kind of *existence*—for the notion of existence, like that of identity, is univocal. Rather, it is just to have certain sorts of properties and relations—spatiotemporal ones. Numbers don't have spatial extension (a 'square' number, after all, isn't square in *shape*), nor do they undergo change: and it is facts like these, if any, which justify our description of them as not existing 'in' space and time. Thus one might be tempted to say that an object is abstract1 if it necessarily lacks spatiotemporal properties and relations. As against this, it may be urged that a spatiotemporal relational property, such as *being thought of today by someone living in Vienna,* can be possessed by a number,

[232] See Campbell, *Abstract Particulars.* Campbell himself is sensitive to the identity problem (see pp. 135 ff.) and as a result moves to a 'field' theory conception of tropes.

[233] Difficulties for this way of drawing the contrast between abstract and concrete entities are raised in Gary S. Rosenkrantz, *Haecceity: An Ontological Essay* (Dordrecht: Kluwer, 1993), 56 ff.—but, as I imply below, I think that these difficulties are not insuperable.

presumably without making it true that numbers exist 'in' space and time. One might respond, however, either by contending that this is not a 'real' but only a 'mere Cambridge' property (rather like Xanthippe's becoming a widow upon Socrates' death), or alternatively—and, I think, preferably—by contending that the property in question is one which a number could only possess *contingently,* while at the same time proposing that for something to exist 'outside' space and time it suffices that that thing should have no *essential* spatiotemporal properties and relations.[234] I shall not pursue the issue further here, however, not being convinced that it harbours any real difficulty for the conception of abstractness now under consideration. I am similarly unconcerned by the objection that items such as *languages* are abstract and yet not timeless, because they are said to undergo change. I believe that one must distinguish between a 'language' conceived of as a *universal,* which is timeless, and a 'language' conceived of as a social practice, which is not (as I pointed out when discussing this very example in Chapter 2). To all of this I should only add that, for reasons explained in Chapter 4, I consider that existence in time is necessarily *tensed* existence and that a tenseless view of time cannot adequately capture what it is for something to exist 'in' time.

One additional question which is worth raising here, however, is whether abstract1 objects, conceived of as existing 'outside' space and time, can have *causal powers,* and whether it would matter if they could not. For some metaphysicians, possession of causal power is the very hallmark of real existence (and is one reason, for instance, why some have denied the existence of the void or absolute space). And some epistemologists, of course, espouse causal theories of knowledge, which would appear to rule out knowledge of the existence of causally impotent objects. My own view, as I shall make clearer later, is that some abstract1 objects—notably certain universals—need to be invoked for explanatory purposes, even if it cannot be said that they themselves possess causal powers or enter into causal relations.

3. Fregean Abstraction Principles

I should now say more about the third conception of abstractness. The idea here is that abstract3 objects are objects 'abstracted' from concepts in accordance with Fregean abstraction principles.[235] These principles are, in

[234] On 'mere Cambridge' properties, see H. W. Noonan, *Personal Identity* (London: Routledge, 1989), 162 ff.

[235] See further Wright, *Frege's Conception of Numbers as Objects.* My characterization of abstract3 objects is partly indebted to a talk delivered some years ago by Kit Fine, though nothing I say should be taken as representing his own views.

fact, a species of *identity criteria* (namely, the 'two-level' or 'Fregean' identity criteria discussed in Chapter 2). Fregean identity criteria are exemplified by Frege's famous criterion for the identity of directions: the direction of line *x* is identical with the direction of line *y* if and only if lines *x* and *y* are parallel with one another. This particular criterion only invokes an equivalence relation on *objects* of a certain sort—lines—but other Fregean identity criteria ostensibly invoke equivalence relations on *concepts* (in Frege's terms). A prime example is what is now known as Hume's Principle: the number of *F*s is identical with the number of *G*s if and only if the *F*s and the *G*s are one-to-one correlated with each other. Here *F* and *G* can be any concepts whatever: for example, they might be the concepts 'fork laid on this table' and 'knife laid on this table', or they might be the concepts 'child in this classroom' and 'book on this shelf'. The suggestion thus is that Hume's Principle can be seen as 'introducing' a kind of abstract3 objects—the cardinal numbers—by way of a certain equivalence relation on concepts, namely, the relation of one-to-one correspondence between objects falling under those concepts. (On the other hand, this construal of Hume's Principle—at least in the form in which I have just stated it—might be challenged, on the grounds that expressions of the form 'the *F*s' are devices of *plural reference,* having as their referents certain pluralities of objects, and that variables of this form may correspondingly be bound by plural quantifiers: in which case, perhaps Hume's Principle is really on a par with Frege's criterion of identity for directions, invoking an equivalence relation on *objects* rather than one on *concepts.* Of course, the Fregean distinction between 'objects' and 'concepts' is, in any case, subject to certain difficulties, as we saw in Chapter 2, so perhaps not too much weight should be laid upon it in the present context. I shall return to the topic of plural reference and plural quantification in section 6 below.)

Another and more infamous example is provided by Frege's Basic Law V, stating that the extension of *F* is identical with the extension of *G* if and only if all and only *F*s are *G*s—a principle which notoriously falls foul of Russell's Paradox and which consequently cannot coherently be thought of as genuinely 'introducing' a kind of abstract3 objects, the 'extensions' of concepts. Clearly, in the light of this failure, some restriction must be placed upon which Fregean abstraction principles can be thought of as legitimately introducing a kind of abstract3 objects. (Note, though, that if such a principle is legitimate, any entities which it introduces will certainly deserve to be called *objects,* because the principle itself will provide them with determinate identity-conditions.)

It is not my concern here to consider whether or how a well-motivated distinction can be drawn between 'legitimate' and 'illegitimate' abstraction

principles. But I do want to question the thought that what such principles, even if paradox-free, can do is really to specify a *kind* of abstract objects. My general point would be that criteria of identity—which is what these principles are—never serve unambiguously to determine the kind of objects to which they apply, for the very simple reason that many *different* kinds of objects are typically governed by the *same* criterion of identity. For instance, dogs and cats are objects of different kinds, but ones which share the same criterion of identity. (This is not to say that any cat can be *identified* with any dog—the point is merely that dogs and cats are both kinds of *animal,* and sub-kinds of the same kind must share the same criterion of identity—here, the criterion of identity for animals in general.)

Hume's Principle certainly can't tell us what sort of thing a cardinal number *is*—and this, indeed, is one lesson of Benacerraf's well-known problem.[236] For all that Hume's Principle tells us, either of the sets ∅, ∅ and ∅ *could* equally *be* the number 2, as indeed could infinitely many other distinct items. The idea that one can 'introduce' a kind of object simply by laying down an identity criterion for objects of that kind really inverts the proper order of explanation. As Locke clearly understood, one must *first* have a clear conception of what *kind* of object one is dealing with in order to *extract* a criterion of identity for objects of that kind from that conception. This, for instance, is how he approaches the problem of *personal* identity. So, rather than '*ab*stract' a kind of object from a criterion of identity, one must in general '*ex*tract' a criterion of identity from a metaphysically defensible conception of a given kind of object. The Fregean approach to abstract objects cannot, it seems, ultimately provide any real insight into questions of ontology. These questions have to be addressed directly by metaphysical analysis and argument: one cannot conjure their answers into existence by laying down stipulative principles.

Despite this criticism, perhaps it would be wrong to jettison altogether the thinking behind the Fregean conception of abstract3 objects. That certain kinds of objects are governed by Fregean identity criteria may indeed be thought to set them apart ontologically in a special way, notwithstanding the doubts which I harboured on this score in Chapter 2. The kinds of objects in question are ones to which we standardly make reference by means of *functional* expressions of appropriate sorts—expressions of the form 'the *F* of *a*'. And here it is worth recalling the definition I advanced in Chapter 6, according to which an entity part of whose *essence* it is to be the *F* of *a* is one which is 'strongly' existentially dependent upon *a,* that is, is one which is *identity*-dependent upon *a. Directions,*

[236] See Benacerraf, 'What Numbers Could Not Be'.

it seems, are a case in point. For directions apparently have to be conceived of as directions *of* something—plausibly, indeed, of lines—and *which* line or lines a direction is the direction of determines *which* direction it is. This suggests a connection with the *second* notion of abstractness considered above, whereby an 'abstract' object is one which is incapable of a 'separate' existence. Arguably, although one can separate 'in thought' a direction from any line of which it is the direction, one cannot conceive of a direction *existing* in the absence of any line possessing that direction. (This claim is more persuasive if one thinks of lines as simply being unidimensional parts of space.) Perhaps, then, any residual value in the third, Fregean conception of abstractness lies in its association with the second conception.

None of this undermines the claim, made in Chapter 2, that two-level or Fregean criteria of identity can always in principle be replaced by one-level criteria, but it may support the thought that the *aptness* of objects of a certain kind to be provided with a two-level criterion of identity reflects their ontologically dependent nature—in short, their abstract2 status. The connection clearly cannot be universal, however, because—for example—cardinal numbers may be provided with a Fregean identity criterion in the form of Hume's Principle: and yet the number of *F*s is not *identity-dependent* upon the concept *F* nor upon the *F*s, in the way that the direction of line *l* is identity-dependent upon line *l*—because there might have been more or fewer *F*s than there actually are, whereas line *l* could not have had a different direction from the direction which it actually has. In short, it is not, in general, part of the *essence* of a given number that it is the number of *F*s, whereas it plausibly *is* part of the essence of a given direction that it is the direction of certain lines (that is, of certain unidimensional parts of space). It is perhaps appropriate to remark here that, apparently, it is only in the case of strongly existentially dependent entities—and not, thus, in the case of *substances,* as these were defined in Chapter 6—that an identity criterion can be supplied which not merely serves to specify necessary and sufficient conditions for their identity in the actual world, but which also serves for them as a principle of so-called 'transworld identity'.

4. Universals and Abstractness

An important distinction which we have not so far taken properly into account in this chapter is the distinction between *universals* and *particulars.* (This is not the same as Strawson's distinction between particulars and non-particulars, I should emphasize; the latter is more akin to my distinction

between objects and those entities that are not objects.)[237] Now, are *all* entities—including any abstract entities that there may be—particulars, as Locke held?[238] And how should we define the distinction between universals and particulars, in any case? I propose to define it—as I did in Chapter 7—in terms of *instantiation*.[239] A particular is something (not necessarily an *object*) which instantiates but is not itself instantiated. Universals, on the other hand, necessarily have instances (or, at least, are instanti*able*). But are universals thus conceived to be regarded as *objects*? (I ask this while still leaving open, as yet, the question of their actual *existence*.) By my account, universals will indeed qualify as objects if they have determinate identity-conditions: and I think it plausible in many cases to hold that they do. For instance, the kind *horse*—which is a universal because it has particular horses as its instances—is surely determinately distinct from the kind *whale* and even from such more closely neighbouring mammalian kinds as the kinds *ox* and *sheep* (though one might wonder about the status of certain hybrid forms of animal). Certainly, the kind *gold* is determinately distinct from the kind *carbon* and even from the kinds of metallic element which are its closest neighbours in the periodic table: for here atomic number provides a clear-cut and unambiguous criterion of identity. (Other universals, such as the colour universals *yellow* and *orange,* are obviously more problematic, in view of the vagueness of their boundaries.)

But are universals, if they exist, *abstract* entities, in any of the senses of 'abstract' which we have investigated? Plausibly, they are abstract1, that is, they are non-concrete, failing to exist 'in' space and time, as I urged in Chapter 7. Of course, particular instances of many universals—for example, particular horses and particular lumps of gold—exist in space and time: but it certainly isn't obvious that the kinds of which these particulars are instances themselves possess any essential spatiotemporal properties or relations. It is true, as we saw in Chapter 7, that some metaphysicians think of each universal as being 'wholly present' in each particular which instantiates it—which would imply, for example, that *gold* (the universal) is 'wholly present' in every particular piece of gold.[240] But I cannot see what saying this can coherently be supposed to add to saying that every particular piece of gold is indeed an instance of the kind *gold*; and I cannot see that saying the latter implies that the universal which all of these particulars instantiate itself has any essential spatiotemporal relations, that is, any essential relations to parts of space and moments of

[237] See Strawson, *Individuals,* 226–7.

[238] See Locke, *Essay,* III. iii. 1.

[239] Cf. my *Kinds of Being,* 38–9.

[240] For discussion, see Armstrong, *Universals: An Opinionated Introduction,* 98–9.

time. (Recall here my argument, in Chapter 7, that we cannot coherently suppose that a universal is 'wholly' *located* where each of its diversely located particular instances is.)

As for the second notion of abstractness, it would likewise seem plausible to say that universals are abstract2 objects: for it is plausible to hold that their existence is 'inseparable' from the existence of their particular instances—that, in short, there cannot be *uninstantiated* universals.[241] Plausibly, not even God could have created the kind *horse* without creating some particular horses. But this claim needn't be seen as conflicting with the previous claim that universals have no essential relations to space and time. Being necessarily instantiated by something which exists in space and time shouldn't be thought of as a spatiotemporal relational property. For one thing, it seems that instantiation cannot coherently be conceived of as being just a certain sort of *relation* between particulars and universals, in the sense of being a *universal* itself with particular instances of its own: for this would appear to generate either a vicious circle or a vicious infinite regress, or both. (Its supposed instances would then have to stand in the instantiation relation to the relation of instantiation—and so on, and so on.) That is why I prefer to think of instantiation as being akin, metaphysically, to identity: a particular's instantiating a certain universal is internal to the (perhaps changeable) nature of that particular—just as its identity is—not an external relation which it bears to another entity, even though the particular and the universal which it instantiates are, of course, distinct entities. But even setting this consideration aside, the following analogy with *sets*—which, according to most philosophers, are paradigmatically abstract1 objects—seems persuasive. A set of concrete objects necessarily has as its members things which exist in space and time: and yet that seems to be no good reason for supposing that such a set must *itself* participate in spatiotemporal relations and thus likewise exist in space and time. So why should the fact that certain universals necessarily have concrete particulars as their instances be a reason for supposing that those universals, like their instances, necessarily participate in spatiotemporal relations and thus exist in space and time too?

What about the question of whether universals could be thought of as abstract3 objects, that is, as objects supposedly 'introduced' by abstraction from concepts? Here we run up against Frege's infamous paradox of the concept 'horse'.[242] Frege treated the expression '——is a horse' as expressing a concept and consequently as not denoting an object. But when we ask *which* concept it expresses, the obvious answer is: the concept *horse*—

[241] Cf. ibid. 75 ff.

[242] See Gottlob Frege, 'On Concept and Object', in *Translations from the Philosophical Writings of Gottlob Frege*. See also my discussion of this in Chapter 2 above.

or, if one prefers, the concept of being a horse. Either way, what we now ostensibly have is a *singular term* denoting a concept, whereas the official doctrine is that singular terms are object-denoting. But even glossing over this problem, a more serious difficulty arises if we try to formulate a Fregean abstraction principle with a view to abstracting concepts as abstract3 objects from concepts themselves, for the obvious candidate for such a principle would be something of the form: the concept *F* is identical with the concept *G* if and only if it is *necessarily* the case that all and only *F*s are *G*s. (The modality invoked here might be interpreted in various alternative ways—for instance, in such a way that the right-hand side of the biconditional means something like 'Any thinker who grasped both concepts would think it true but uninformative that something is *F* if and only if it is *G*'.)[243] But such a principle is apparently in no better shape than Frege's Basic Law V.

5. Are There Any Abstract Objects?

Abandoning, now, the notion of abstract3 objects as altogether too problematical, we can ask whether, in the first and second senses of abstractness, there might actually be any abstract objects, either universals or particulars. My view is that there indeed are. Universals—or, at least, some universals, notably certain *kinds*—appear, as we have seen, to qualify as abstract objects in both of these senses; and I believe that we need to invoke the existence of such universals because they figure essentially in *natural laws* governing the behaviour and composition of all particulars which instantiate those universals.[244] This consideration applies most obviously to *natural* kind universals, such as the kinds *horse* and *gold,* as opposed to artefactual kinds like *table.* There are laws governing the behaviour and composition of all particulars instantiating the kind *gold* which they obey only in virtue of being instances of that kind—such as, that they are soluble in aqua regia and are composed of atoms containing 79 protons in their nucleus.

But what about *abstract particulars*—do any objects in this category actually exist? As regards abstract2 objects, I have already challenged the claim of some metaphysicians that *tropes* provide an example of such

[243] Such a principle is perhaps superficially reminiscent of the sort of thing invoked by Christopher Peacocke for the purpose of individuating what *he* calls 'concepts', though Peacocke explicitly distances himself from the Fregean view of concepts in this context: see Christopher Peacocke, *A Study of Concepts* (Cambridge, Mass.: MIT Press, 1992), 2.

[244] See my *Kinds of Being,* ch. 8, and cf. David M. Armstrong, *What is a Law of Nature?* (Cambridge: Cambridge University Press, 1983).

particulars—because I do not believe that 'tropes' can be seen as having determinate identity-conditions and so do not think that they can qualify as *objects* at all. I allow that *modes* exist, but not as 'objects'. However, I am happy to allow that *events,* for example, qualify as abstract2 objects: an event, such as the death of a particular horse, qualifies as an 'object' because it has, I believe, determinate identity-conditions, but at the same time it qualifies as abstract2 because it cannot exist 'separately' from the horse whose death it is. As we might again put it, not even God could have created the death of this horse without creating this very horse. Furthermore, I believe that we must allow that events do actually exist—that is, we must include them in our ontology—because they figure indispensably in singular causal explanations. An event such as the death of a particular horse has its own distinctive causes and effects. One cannot be an 'eliminativist' about events in general, in the way one might hope to be quite generally about artefacts (tables and the like).

However, events are clearly *concrete* objects, in that they essentially possess at least temporal properties and relations. We are still left, thus, with the question of whether there are any abstract1 objects that are particulars—particular objects which, like universals, do not exist 'in' space and time. Two obvious candidates are *sets* and *numbers,* upon which I shall concentrate for the remainder of this chapter. Another traditional candidate would be *God,* but I do not feel equipped to discuss this possibility here.

6. Numbers and Sets

In what follows I shall confine myself, for simplicity, to consideration of the natural numbers, 1, 2, 3, 4, ... These are often taken to be abstract1 particulars: indeed, they are often identified, for theoretical purposes, with certain *sets*—2 with the set ∅, ∅, for instance (where '∅' denotes the empty set). Sets, likewise, are commonly regarded as abstract1 particulars—even when their members are concrete objects, as in the case of the set of planets of the sun. My own view, however, is that the natural numbers are *universals*—kinds—rather than particulars: indeed, that they are *kinds of sets,* that is, that they are kinds whose *instances* are sets. I shall explain and defend this contention more fully in the next section.[245] Hence, on this view, numbers are certainly not *themselves* sets, any more than the kind *dog* is itself a dog. Specifically, the number 2 is, according to this account, the kind of two-membered sets (there is no circularity here, as we

[245] I first proposed this in my 'Are the Natural Numbers Individuals or Sorts?', *Analysis,* 93 (1993), 142–6.

shall see). That is, each two-membered set is 'a' 2, quite in the way in which each particular dog is a dog.

Rather than hold, as is more common, that the notion of number is to be explained in terms of the notion of set, I am inclined hold the reverse of this. I am inclined to hold that the notion of a set is precisely the notion of *a number of things*. That is to say, a set just *is* 'a number of things'.[246] This, I think, is much preferable to saying that a set is a 'collection' of things, which is at best a metaphor. Nothing literally 'collects' the members of a set, such as the set of planets of the sun—unless it be a Fregean 'concept' under which they all fall. But—not to speak of the fact that there aren't 'enough' concepts for every set to be 'collected' by one—in the case of many sets such a concept is at best only made available once the membership of the set has already been specified, as in the case of the set whose members are the front door of my house, North America, and the positive square root of 2. Yet even this set is just 'a number of things'—a *threesome*—and by my account just an instance of the numerical kind 3. It is, quite literally, 'a' 3.

Let us, however, reflect a little further on the nature of the 'set' of planets of the sun. We are happy to say 'The planets are nine', which is seemingly just equivalent to saying 'The number of the planets is nine'. Moreover, it is very tempting to contend that there is at most only a grammatical distinction between the plural noun phrase 'the planets and the singular term 'the set of the planets'.[247] On this view, the words 'set of the' in the latter term are only there to transform a plural noun phrase into a singular one, a transformation which exists merely to satisfy certain idiosyncrasies of idiom. This would be to treat a plural noun phrase such as 'the planets' as itself denoting a set, construed in my way as being, quite simply, a number of things. And, after all, who would want to deny that the planets are 'a number of things'? It is tempting, then, to see the following statements—'The set of the planets is nine in number', 'The number of the planets is nine' and 'The planets are nine'—as all being ways of saying the same thing: that a certain number of things is 'a' 9, a ninesome.

Here it may be inquired what, on this view, it is to *be a member of* a set. The obvious answer is that to be a member of a set is just to be one of a certain number of things—for instance, to be one of the planets, or to be one of the following things: my front door, North America, and the positive square root of 2.[248] It must be accepted that this notion of 'being one

[246] Interestingly enough, this is precisely how the *Concise Oxford Dictionary* defines a set.

[247] Cf. Peter Simons, 'Plural Reference and Set Theory', in Barry Smith, ed., *Parts and Moments: Studies in Logic and Formal Ontology* (Munich: Philosophia Verlag, 1982).

[248] Cf. ibid. 213.

of a certain number of things' cannot be further reduced, but I don't consider that this makes it in any way mysterious. Formally, if armed with plural quantification, one might define '$a \in b$' as meaning '$(\exists X)(X=b\&a:X)$'—reading the latter as 'There are some things which are b and a is one of them'.[249]

Now, for various reasons which need not be gone into here, I have doubts about assimilating singular reference to sets to plural reference to their members, despite the tempting simplicity of this approach. But such assimilation is not essential to the main claim which I do want to advance, namely, that a set is simply a number of things and thus best understood as being a particular instance of a numerical kind. Suppose, then, that this view of sets as being instances of numerical kinds is accepted. (I will, as I say, explain and defend it more fully in the next section.) Does it follow that we should think of sets as *abstract objects,* in any of the senses of 'abstract' discussed earlier? That sets so conceived qualify as *objects* is supported by the fact that the Axiom of Extensionality provides them with determinate identity-conditions, at least to the extent that their members have these—this being the principle that if x and y are sets, then x is identical with y if and only if x and y have the same members. And that they are abstract2 surely follows from the fact that, with the trivial exception of the empty set, a set cannot exist 'separately' from its members: not even God could create a set without creating its members. But as for whether sets are abstract1—non-spatiotemporal—this might appear to depend on whether or not their members are.[250] However, even with a set like the set of the planets, it is—as we saw earlier—far from obvious that *it* has any essential spatiotemporal properties and relations, even though its members obviously do. (We shall return to the matter in the next section.)

But do sets in fact *exist*? That is—to put it in my terms—*are* there really any instances of the numbers? If there are not, then, on the assumption that uninstantiated universals cannot exist, neither will the numbers themselves exist. Once again, we should bear in mind here considerations of explanatory value. But, certainly, it appears that numbers play an important role in natural laws—for instance, in the Newtonian inverse square law of gravitation and in specifying the values of various constants of nature, such as Planck's constant.[251] Likewise, they play an important role in measurement.

[249] I say more about plural quantification in my 'Noun Phrases, Quantifiers, and Generic Names'.

[250] This appears to be Penelope Maddy's view: see her *Realism in Mathematics* (Oxford: Clarendon Press, 1990), 50 ff.

[251] Here, of course, one needs to bear in mind the arguments of Hartry Field in his *Science without Numbers* (Oxford: Blackwell, 1980).

Of course, it might also be argued, with a good deal of plausibility, that the numbers exist *of necessity* if they exist at all—and even that they must exist if anything at all exists. Moreover, sets appear to come so cheaply that it is hard to see why anyone should deny their existence who accepts the existence of their members—deny, for instance, that the set of the planets exists while accepting that each of the planets exists. If each of them exists, then, surely, *the planets* exist: and if this *is* all it means to say that the 'set' of the planets exists, then that set most certainly exists. And if it exists, 'a' 9 exists—and so 9 exists. But 9 surely could not exist if none of the other natural numbers existed.

However, one might understandably doubt whether concerns like this really have much metaphysical importance, in the way that other ontological concerns do. Does it, in the end, really matter whether the numbers actually exist—in anything like the way in which it matters whether *space and time* or *persons* actually exist? Some will find it hard to suppose so. Perhaps they will think it enough, for mathematical purposes, that numbers *could* exist, if indeed that is a possibility distinct from that of their *actually* existing. I shall not attempt to resolve these doubts here, though we shall return to them in the last chapter of the book, when we come to address the question of why there should be anything at all. But now it is time for me to fulfil my earlier promise to explain and defend more fully my contention that the natural numbers are universals rather than, as is more commonly supposed, particulars.

7. Numbers as Universals

Few could deny that it is tempting to regard the natural numbers, 1, 2, 3, 4, . . . , as abstract1 objects.[252] Suppose we yield to the temptation: still we may ask whether they are abstract1 *particulars* or, rather, *universals,* that is to say, kinds. Kinds are universals—more specifically, they are 'sortal' as opposed to 'characterizing' universals[253]—and so necessarily abstract1 rather than concrete entities. (Roughly, a sortal universal is one which conveys not only a criterion of *application* for its instances, but also a criterion of *identity* for them, in the terminology of Michael Dummett.)[254] Some familiar examples of kinds are the natural kinds *horse, oak tree,* and *proton,* but there are also artefactual kinds (such as *table* and *knife*) and abstract1 kinds—that is, kinds of abstract1 objects, such as the

[252] Cf. Wright, *Frege's Conception of Numbers as Objects.*

[253] Cf. Strawson, *Individuals,* 168.

[254] See Dummett, *Frege: Philosophy of Language,* 73 ff. See also my discussion of this distinction in Chapter 2.

mathematical kinds *ellipse* and *set*. Of course, it is relatively uncontentious that the general term 'natural number' denotes an abstract1 kind, but the question now at issue is whether *each* of the natural numbers, 1, 2, 3, 4, . . . , is itself an abstract1 particular or whether, rather, each of them is a *kind* and thus a *universal*.

If the natural numbers *are* kinds, then what are they kinds of? The most plausible answer, I think, is the one I gave in the last section: they are kinds of *sets* (and thus kinds of abstract1 particulars). But it is vital, in what follows, to distinguish carefully between my proposal that numbers are *kinds of sets*—that is, kinds *whose instances are sets*—and the quite different (and in my opinion quite mistaken) view that numbers are *a kind of set,* that is, are *sets* of a certain kind. For instance, then, according to my proposal, the number 2 is the kind of two-membered sets (pairs): so that the two-membered sets London, Paris and Napoleon, Wellington are both *twos,* in precisely the same sense in which London and Paris are both *cities* and Napoleon and Wellington are both *men*. Of course, 'The set London, Paris is a two' is hardly idiomatic English. But then, ordinary idiomatic English has few resources for explicit talk about sets anyway, so we should not be surprised. Even so, it may be doubted whether ordinary ways of talking about number provide any support at all for the proposal now under scrutiny. On the contrary, I think that they do.

Consider a simple arithmetical statement of addition—such as '2+2=4'—and consider how one typically teaches a child to see the truth of such a statement. One typically displays a pair of objects—fingers, say—then *another* such pair, brings the members of the two pairs into proximity and requests the child to count them all. To accompany the procedure one says 'Two, plus *another* two, make . . . ' and the child says (we hope) ' . . . four'. It is crucial, of course, that we really do have *two* twos on display! But this very language ('another two', 'two twos') confirms the suggestion that 'two', when used as a noun, functions as a sortal term (compare 'another *horse*', 'two *horses*'). Now, if '2' in '2 + 2 = 4' really denoted an abstract1 *particular,* the foregoing procedure would be quite mysterious—indeed, it would be mysterious to a child how numbers could be *added* at all. For if 2 is a particular, 'adding' it to *itself* can, it would seem, only leave us with 2, not *another* number. (Analogously, if 'Socrates+ Socrates' denotes anything, it most plausibly just denotes *Socrates*.) This is why it is crucial, in the teaching procedure, that we display a *second* two in addition (*sic*) to the first, rather than just displaying the first two twice. (Of course, I don't deny that a sense *can* be ascribed to 'addition' which will not have this absurd result when 2 is regarded as a particular—say, as the set ∅, ∅; I only want to suggest that this sense must be considerably removed from that at work in our talk to the child.)

The proposal, then, is that we take the ordinary language of addition pretty much at its face value and render '2 + 2 = 4' in words as '(A) two plus (another) two make (a) four'. This requires us to treat 'two' and 'four' as sortals and hence to recognize the legitimacy of such predicates as '——is (a) two' and '——is (a) four'. In logical notation, '2 + 2 = 4' comes out as meaning something like '$(\forall x)(\forall y)(((2)x\&(2)y\&\neg(x=y))\rightarrow(\exists z)((4)z\&x+y=z))$', where '$(2)x$' symbolizes '$x$ is (a) two'. (Actually, we need something stronger than '$\neg(x = y)$' in the antecedent since what is required is that x and y have *no* members in common, whereas their non-identity only requires them *not* to have *all* their members in common: but the adjustment is easily made using standard set-theoretical notation, to give '$(\forall x)(\forall y)(((2)x\&(2)y\&x \cap y= \varnothing)\rightarrow(\forall z)((4)z\&x\cup y=z))$'.) Now, if 'two' and 'four' *are* sortals, we are entitled to ask for some examples of particular items to which they apply. But, as we have just seen, these are ready to hand (literally) in the shape of *pairs* and *quadruples* of one's fingers, or indeed pairs and quadruples of any other things one cares to mention. This fact, I suggest, greatly enhances the epistemological attractiveness of the present proposal, especially in comparison with the view that the natural numbers are abstract1 particulars. For if they are the latter (things like the set $\{\varnothing, \varnothing\}$), we plausibly have no empirical acquaintance with them whatever, whereas on the view now being canvassed we can at least have displayed to us particular *instances* of the natural numbers, which puts us at no more epistemological disadvantage with respect to them than we are with respect to other kinds, with which we are likewise acquainted empirically only through their particular instances (particular horses, oak trees, and the like).

Here it may be objected that I have just spoken as if particular sets—which is what I have taken instances of the natural numbers to be—can literally be *seen,* in just the way that particular horses can be: and yet I have also assumed that sets are *abstract*1 particulars. The problem is that the hallmark of abstract1 entities, as we saw earlier in this chapter, is that they do not exist in space or time and lack causal powers, whereas perception is commonly supposed to be a process involving a causal transaction between the perceiver and the object perceived. There are various possible responses to this objection and for my present purposes I don't really need to decide between them: rather, they may be seen as different potentially interesting ways of developing the basic proposal that the natural numbers are kinds rather than particulars. One fairly radical possibility is to reject the standard way of drawing the abstract/concrete distinction,[255] or indeed to reject the causal theory of perception. Another

[255] Cf. Hale, *Abstract Objects,* 45 ff. However, I challenged Hale's account in Chapter 2 above.

is to insist that some sets can indeed literally be seen and accept that this implies that they must, after all, be concrete objects.[256] Yet another is to hold on to the intuition that the number 2, say, is the kind of pairs and that some particular pairs—such as a pair of fingers—can literally be seen (accepting the implication that such a pair is a concrete object), while drawing a distinction between a pair thus conceived and the corresponding two-membered set. Finally (though even this may not exhaust the possibilities), one may avoid challenging any of the common assumptions and just adopt a more cautious construal of my earlier talk about *displaying* instances of the natural numbers: thus, instead of taking this to imply that we can literally *see* a pair of fingers (in addition to each of the fingers themselves), we may take it merely to imply that we can, in suitable circumstances, acquire a *perceptual belief* about such an item.[257] This will still entitle us to claim an epistemological advantage for the proposal that the natural numbers are kinds (of sets) and is the response which I tend to favour, on grounds of its conservativeness.

But if the natural numbers *are* kinds, can we be sure that *enough* of them exist for mathematical purposes—a denumerable infinity of them, in fact? For, as we have seen, it is strongly arguable that uninstantiated kinds do not exist, that is, that every existing kind must have existing particular instances (this being an 'Aristotelian' view of universals, as opposed to a 'Platonic' one). So, if natural numbers are kinds of sets or *n*-tuples, we must be satisfied that for any *n* there is at least one *n*-tuple. This requires there to be a denumerable infinity of objects. But provided that at least *one* particular object exists (a concrete one, perhaps, such as myself, whose existence is ensured by the Cartesian *cogito*), that requirement is easily met, even if one has qualms about distinguishing between an object and its unit set.[258] For any particular object, *P,* is necessarily an object of some *kind, K.*[259] So we have as an instance of *two* the set *P, K.* As an instance of *three* we have *P, K, P, K,* as an instance of *four P, K, P, K, P, K, P, K,* and so on *ad infinitum* (and thus we see that, of logical necessity, the natural numbers exist provided anything at all exists).

It is vital to appreciate that, on the present proposal, what we are purporting to generate by this series is not the series of natural numbers themselves (in the sense that the numbers are to be *identified* with the members of this series), but rather a series of particular *instances* of those numbers, whose existence as kinds is thereby guaranteed. This draws attention to

[256] Cf. Maddy, *Realism in Mathematics,* 50 ff., and see further Shaughan Lavine's review of Maddy's book in the *Journal of Philosophy,* 89 (1992), 321–6.

[257] Cf. Lavine's review of Maddy, 323.

[258] For discussion of such qualms, see Lewis, *Parts of Classes,* 29 ff.

[259] See further my *Kinds of Being,* 4–5.

one very important advantage of the present view over the view that the natural numbers are abstract1 *particulars*: this is that the latter view, as Paul Benacerraf has famously argued, finds it impossible to say non-arbitrarily *which* abstract1 particulars the natural numbers are, since infinitely many different classes of equally good (and thus equally bad) candidates for that role are available.[260] One such class is the class whose members form the series ∅, ∅, ∅, ∅, ∅, ∅, ∅, . . . , another that whose members form the series ∅, ∅, ∅, . . . , and indeed another would be the class whose members form the series *P, P, K, P, K, P, K, ...* Benacerraf considers—rightly, in my view—that this embarrassment of riches undermines the claim that the natural numbers are abstract1 particulars (sets, at least) at all. But we needn't concur with him in refusing to accept, consequently, that they are abstract1 *objects* at all—and unambiguously identifiable ones at that. They are not *particular* sets, but *kinds* of sets: and such kinds are quite as much 'objects' as are particulars.

I should stress, incidentally, that the view that the natural numbers are *kinds* of sets should in no wise be assimilated to the Frege–Russell view that they are *classes* of equivalent sets, which again represents them as being abstract1 *particulars*.[261] Note especially that in saying that 2 is the *kind* of pairs or two-membered sets, we don't even have to begin to contemplate the awkward question of whether one can legitimately speak of *all* two-membered sets (or the class thereof), since a kind is not *individuated* by its instances as a class is by its members. Provided that *some* two-membered sets exist—it doesn't matter *which* or *how many*—then the kind exists and there is no problem about its identity, whereas the identity of a class does indeed depend on which things are members of it and hence cannot be regarded as unproblematic so long as there is a problem about specifying that membership. For the same reason, it is no problem for my view that the set 1, 2 is an instance of 2 despite containing 2 itself as a member, in the way that it is a problem for the view that 2 is a class of pairs that 1, 2 appears to be a pair containing 2 itself as a member (the point being, again, that on my view 2 is individuated independently of any particular instance of it, including this one, whereas on the rival view the individuation of 2 is threatened by vicious circularity).

[260] See Benacerraf, 'What Numbers Could Not Be'.

[261] I should also say that *kinds* of sets are not to be assimilated to *properties* of sets, for quite general reasons explained Chapter 8; see also my *Kinds of Being,* ch. 3. Thus I disagree with Penelope Maddy's view that 'sets have number properties in the same sense that physical objects have length' (R*ealism in Mathematics,* 98).

11 Facts and the World

In previous chapters of this book, I have defended what may be called a *substance ontology*—that is, an ontology which takes persisting, concrete things or 'continuants' to be the most fundamental entities in the world, upon which entities of other categories depend, in one way or another, for their existence. Such an ontology has several rivals which are worthy of respect: one, for example, is the 'trope' ontology discussed and criticized in Chapter 9. Another serious rival to the substance ontology is one which takes *facts* or *states of affairs* to be the most fundamental entities. Whether facts are fit to occupy this role is one of the questions that I shall address, albeit somewhat obliquely, in the present chapter: the implication of my arguments will be that they are not. Of course, one does not have to deny the reality of facts altogether in order to return such an answer. Indeed, facts seem to be ontologically indispensable, certainly as truth-makers and perhaps also as causal relata. We say, for instance, that the fact that Mars is red makes it true that Mars has a colour. And we say that the fact that a certain stone is heavy causes it to fall when it is released—though we shall see, in due course, some reason to resist saying things like the latter.

Here we appear to have two quite distinct facts, the fact that Mars is red and the fact that this stone is heavy. What entitles us to say that these are indeed distinct facts, though? How firm is our grasp on the identity-conditions of facts? Some philosophers, adhering to the Quinean dictum 'No entity without identity', would urge that if we are to justify including facts in our ontology, we must be prepared to state a criterion of identity for them. To be committed to the existence of facts, on this view, is to include facts amongst the values of our variables of quantification: 'To be is to be the value of a variable'.[262] And, it is alleged, we cannot intelligibly quantify over items for which we cannot supply principles of identity and individuation. After all, it may be said, the existential quantifier, '$(\exists x)$', simply means 'There is at least one thing, *x,* such that': and this implies that, whatever value '*x*' may take, that value must qualify as *one* thing of some kind and consequently as something individuable in principle. On this

[262] See W. V. Quine, 'Speaking of Objects', in his *Ontological Relativity and Other Essays,* and *Pursuit of Truth,* 52. See also the discussion in Chapter 2 above.

view, if there is a problem about fact identity—as I think there is—then that is a reason for extruding facts from our ontology altogether. Yet if facts are ontologically indispensable, that is something which we cannot do. So we seem to be faced with a dilemma. Rather than abandon facts, however, I prefer to take a more liberal view of quantification, allowing that we may intelligibly quantify over items which are not unproblematically individuable (as indeed I maintained in Chapter 2). This will require some other reading of the existential quantifier, '$(\exists x)$', than the standard one just stated. I propose to read it quite simply as meaning 'There is something x such that', which implies nothing explicitly about the individuability of the values of the variable. The exact bearing of this on my view of facts will only emerge, however, after much intervening discussion of other matters, to which I shall now turn.

1. How to Refer to Facts

Why, it will be asked, should we think that there is a problem about fact identity? Does not our canonical mode of reference to facts indicate, on the contrary, that we think facts to be unproblematically individuable? That canonical mode of reference exploits noun phrases of the form 'the fact that *P*', where '*P*' is a place-holder for any sentence: for example, 'the fact that Mars is red' and 'the fact that this stone is heavy'. And the point is that this canonical mode of reference utilizes the definite article, 'the', thereby surely implying uniqueness of reference—that is, implying that what is referred to by such an expression is some *one* individuable item: some *one* fact. However, our talking as if facts are unproblematically individuable cannot make them so. It may turn out, for instance, that if we try to state a workable criterion of identity for facts, facts which we fondly imagine to be distinct collapse into one.[263] Even if 'the fact that Mars is red'

[263] There is, indeed, a notorious and much disputed argument—now often referred to as the 'slingshot'—to the effect that all facts collapse into one, the 'Great Fact'. This, of course, is not offered as *support* for the claim that there is just one fact, but rather as a *reductio ad absurdum* of the idea that facts are identifiable entities (and hence, for many, a *reductio* of the idea that facts exist). For an influential version of this argument, see Donald Davidson, 'True to the Facts', reprinted in his *Inquiries into Truth and Interpretation,* 41–2. The name 'slingshot' was coined by Jon Barwise and John Perry: see their 'Semantic Innocence and Uncompromising Situations', in P. French *et al.,* eds., *Midwest Studies in Philosophy,* vol. vi (Minneapolis, Minn.: University of Minnesota Press, 1981). The argument in all of its versions is exhaustively examined by Stephen Neale in his 'The Philosophical Significance of Gödel's Slingshot', *Mind,* 104 (1995), 761–825. See also Kenneth R. Olson, *An Essay on Facts* (Stanford, Calif.: CSLI, 1987), 83 ff. The earliest version of the argument has been attributed to Frege: see Alonzo Church, *Introduction to Mathematical Logic* (Princeton, N.J.: Princeton University Press, 1956), 25.One version goes as follows. If facts exist and a certain sentence, *P,* is true, then it is surely undeniable that: (1) the fact that *P* is identical with the fact that *P.* However, it is plausible to assume that the (supposedly) singular term 'the fact that *P*' does not change its reference if we substitute for *P* any other sentence which is logically equivalent to *P,* nor if we substitute for any singular term in *P* another singular term with the same reference. This being so, let *Q* be any arbitrarily chosen true sentence distinct from *P* and let *a* be any arbitrarily chosen object. Then it is easily provable that *P* is logically equivalent to the following sentence: '$\{a\} = \{x\colon x = a \,\&\, P\}$'. (This may be read as follows: 'The unit set of *a* is identical with the set every member *x* of which satisfies the condition that *x* is identical with *a* and *P* is the case.') Hence, from (1) we can, given the first of our assumptions, deduce: (2) the fact that *P* is identical with the fact that $\{a\} = \{x\colon x = a \,\&\, P\}$. Now, it is likewise provable that *Q* is logically equivalent to '$\{a\} = \{x\colon x = a \,\&\, P\}$'. It follows that the two singular terms '$\{x\colon x = a \,\&\, P\}$' and '$\{x\colon x = a \,\&\, Q\}$' have the same reference, since both have the same reference as the singular term '$\{a\}$'. Accordingly, given the second of our assumptions, we can substitute the second of these terms for the first in (2) to deduce: (3) the fact that *P* is identical with the fact that $\{a\} = \{x\colon x = a \,\&\, P\}$. Finally, using the already established logical equivalence between *Q* and '$\{a\} = \{x\colon x = a \,\&\, P\}$', from (3) we can deduce: (4) the fact that *P* is identical with the fact that *Q.* Thus, given our assumptions, we have been able to deduce that, for any arbitrarily chosen true sentences *P* and *Q,* the fact that *P* is identical with the fact that *Q*—and consequently that there is really only *one* fact. This argument is open to challenge at several points and I do not want to endorse it myself. However, as will be seen later on in this chapter, I do believe that the argument contains the seeds of genuine difficulties for the idea that facts are unproblematically individuable.

and 'the fact that this stone is heavy' do, each of them, refer to a unique fact according to such a criterion, this will be no consolation if it also turns out that, according to that criterion, they refer to the *same* fact. Anyway, there is another mode of reference to facts which does not carry on its sleeve any clear implication of uniqueness of reference: this is the mode of reference which exploits noun phrases of the form 'its being the case that *P*'—where the 'it', of course, no more carries any referential force of its own than does the 'it' in 'It is raining'. Nothing about the syntactical form of such a noun phrase marks it out as being a *singular term,* in the same syntactic category as proper names and singular definite descriptions. To say that such noun phrases have 'references' is not to commit oneself to the view that each such phrase, if it succeeds in referring at all, refers to just *one* identifiable item of any kind. So, to avoid begging any question as to the individuability of facts, I prefer to use this second mode of reference to facts rather than what I earlier called the 'canonical' mode—though very often I shall use the latter for the sake of convenience. This preference does not in any way compromise my ability to invoke facts as truth-makers and (if this be desirable) as causal relata: I can say, for instance, that its being the case that Mars is red makes it true that Mars has a colour and that its being the case that this stone is heavy causes it to fall when it is released.

A question which may seem relevant at this point is whether noun

phrases of the form 'the fact that *P*' may be regarded as *definite descriptions*. The relevance of this question is that although, of course, many philosophers regard definite descriptions as singular referring expressions, many others do not, holding them to be instead covert devices of quantification.[264] The latter philosophers, then, were they to hold that noun phrases of the form 'the fact that *P*' are definite descriptions, would reject the assumption I have so far been making that such noun phrases are indeed referring expressions. However, in the first place, the proposal that such noun phrases *are* definite descriptions—at least of the kind accommodated by Russell's theory of descriptions—seems untenable, as can be seen if we try to apply that theory to a sentence of the form 'The fact that *P* is *F*'. For such a sentence will be translated by the theory as meaning '$(\exists x)$(x is a fact that *P* and $(\forall y)$(if y is a fact that *P,* then $y = x$) and x is *F*)': and yet the latter makes very doubtful sense, because expressions of the form 'is a fact that *P*' appear to be mere pseudo-predicates, which can only be completed by a dummy-subject, 'it', to produce sentences of the form 'It is a fact that *P*'. Moreover, even if such a Russellian analysis were correct, the implication would still be that facts are unproblematically individuable, because a quantified sentence of the type just cited makes a *uniqueness* claim concerning facts, namely, a claim to the effect that there is *one and only one fact* that *P*. But my preference for noun phrases of the form 'its being the case that *P*' to ones of the form 'the fact that *P*' derives entirely from my scepticism about the implications of *uniqueness and individuability* which noun phrases of the latter form convey and is thus motivated quite independently of my inclination to regard such noun phrases as referring expressions (an inclination which, however, I shall continue to indulge in what follows).

2. What in the World Is a Fact?

My preference for avoiding noun phrases of the form 'the fact that *P*' is only warranted to the extent that I am justified in thinking that there really is a problem about fact-identity. Is there? In order to answer this question, we must naturally take some view as to what facts are supposed to *be*. What sort of entity is a fact? Are facts entities that are 'in' the world, perhaps even as *parts* of it? That, of course, will partly depend on what we understand *the world* to be. Wittgenstein famously said, in the *Tractatus,* that the world is 'the totality of facts, not of things'—it is 'everything that

[264] See e.g. Stephen Neale, *Descriptions* (Cambridge, Mass.: MIT Press, 1990).

is the case'.[265] Here, of course, one must take him to be using 'thing' in a restricted sense in contrasting things with facts, but using 'everything' in a more general sense in describing the totality of facts as 'everything that is the case'. That is to say, one cannot take him to be using 'everything' here just to mean 'every *thing*', in the restricted sense of 'thing'. (Recall our discussion of this distinction in section 1 of Chapter 2.) In this restricted sense, I assume, a 'thing' is an *individual object*—so by 'things' in this sense I assume is meant such items as trees, people, stars, cities, and atoms. Now, of course, we commonly suppose there to be such a thing (again in the restricted sense of 'thing') as the sum or aggregate of all the objects that exist: and this we may perhaps call 'the universe'—though it would have a fair claim to be called, indeed, 'the world'.[266] But then it would seem that the universe is not the same as what Wittgenstein calls 'the world', for the universe precisely *is* the totality of 'things', which he denied 'the world' to be.

All of this presupposes, of course, that facts are not themselves 'things', in the restricted sense—that is, that they are not individual objects, but something else. What else? One possibility is that they are something wholly abstract and therefore non-spatiotemporal: most plausibly, something 'proposition-like' or 'thinkable' (though that is merely trading one relatively obscure notion for another). Another possibility is that facts, while not themselves concrete objects, are complex structured wholes which can and very often do contain concrete objects as parts or constituents. Unfortunately—and this is where we begin to see why there is indeed a problem about fact-identity—philosophers who have invoked facts are divided over this fundamental issue as to whether facts are wholly abstract entities or are complexes capable of containing concrete objects as constituents. If we are not even clear about *that,* how can we hope to be clear about the identity-conditions of facts?

Let us briefly explore the two alternative views just adumbrated: the view that facts are structured complexes of objects, some of them concrete, and the view that they are wholly abstract entities. On the first view, the fact that Mars is red—its being the case that Mars is red—contains Mars itself as a constituent. What else will it contain? We may want to say

[265] See Ludwig Wittgenstein, *Tractatus Logico-Philosophicus,* trans. C. K. Ogden (London: Routledge & Kegan Paul, 1922): see propositions 1 and 1.1. I have preferred this translation to that of D. F. Pears and B. F. McGuinness (London: Routledge & Kegan Paul, 1961), who translate proposition 1 as 'The world is all that is the case' rather than as 'The world is everything that is the case'.

[266] This supposition has been challenged: see e.g. Bas van Fraassen, " 'World" is not a Count Noun', *Nous,* 29 (1995), 139–57. However, I shall not be challenging the supposition myself.

that it also contains the property of being red, or redness, as a constituent. On the assumption that this is a universal and so, by most accounts, an abstract rather than a concrete entity, taking this view will require us to say that *not all* of the constituents of a fact need be concrete objects. If that is thought to present a problem, however, one might try to dispense with universals, perhaps invoking 'tropes' instead—in this case, the particular redness of Mars, conceived as something which resides in space and time and is therefore concrete—or else one might try to argue that a universal such as redness does, after all, reside in space and time, perhaps on the grounds that it is 'wholly present' in each of the concrete objects which exemplifies it at any time and place. (Recall that I discussed and criticized this view in Chapter 7 and again in Chapter 10.) However, nothing much turns on such questions at the moment, so I shall speak as though, on the view of facts as structured complexes, they contain universals amongst their constituents, leaving open for present purposes the question as to whether universals are abstract or concrete entities.

What of the alternative view of facts adumbrated earlier? What is distinctive about this view is that it treats all facts as wholly abstract entities, necessarily devoid of concrete constituents, even facts which are in some sense facts 'about' concrete objects, such as the fact that Mars is red. On this view, Mars itself is not a constituent of that fact. But why not? After all, *sets* are paradigmatically abstract objects and yet may contain concrete objects as their members—for instance, the set whose members are the planets Venus and Mars. So why shouldn't one be able to hold *both* that the fact that Mars is red is a wholly abstract entity *and* that that entity contains the concrete object Mars as a constituent? The answer is that the relation of a whole to its parts is quite different from the relation of a set to its members. Anything which is at least partly constituted by concrete objects cannot itself be wholly abstract: for part of it, quite literally, resides in space and time. By contrast, no part of a set resides in space and time, even if its members (in the set-theoretic sense of 'member') do. According to this view of facts as wholly abstract entities, should we then say that facts are not in any genuine sense 'complexes' which contain other entities as parts? That is unclear, since two options seem to be open to us. One is to say that facts are *unities,* in a strong sense which precludes us from seeing them as being composed of parts of any kind. In support of this one might appeal to the supposedly 'proposition-like' or 'thinkable' character of facts, for it does seem nonsensical to talk of 'part' of a *thought,* in any sense which would imply that a thought is literally a composite entity. One either has a complete thought or no thought at all: one cannot have just 'part' of a thought. (Here, of course, by a 'thought' I mean *something that is thought*—the *content* of an act of thinking, rather

than an act of thinking itself.) On the other hand, it is often urged that thought, like language, must be in some sense 'compositional', in that different thoughts can share common elements. If that is right, then perhaps facts, conceived as wholly abstract entities, might be held to be complexes whose constituents are themselves wholly abstract entities. Thus, the fact that Mars is red, although not containing *Mars* as a constituent, will, on this view, contain as a constituent some abstract entity which somehow 'represents' Mars—perhaps something like Mars's 'individual essence', conceived as a universal which necessarily has Mars as its only exemplification.

If facts are indeed 'proposition-like' or 'thinkable'—and in support of this it may be pointed out that we speak of *knowing* facts, *understanding* them and so forth—might they not simply be true propositions, as some philosophers have held? Against this it may be urged that the proposition that *P* would still exist even if it were not true that *P,* whereas the fact that *P* apparently only exists provided that it *is* true that *P.*[267] Having different existence-conditions, facts and true propositions cannot, then, be identical with one another. On the other hand, it might be contended that being a fact is simply a role which a proposition occupies just in case it is true, so that the fact that *P does* still exist if it is not true that *P,* although in that case it is not a fact but just a *false* proposition. Either way, though, it might be queried whether we need to admit facts into our ontology *in addition to* true propositions. Clearly, we don't need to if facts just *are* true propositions. But if they are not, why do we need both? One obvious answer is that facts are needed to be the *truth-makers* of true propositions, which cannot be *their own* truth-makers. We shall return to this consideration later. But what about the other putative role of facts, that of being causal relata?[268] To that I shall now turn.

3. Facts and Causation

Surely, there is a difficulty for *any* view of facts which sees them as being *wholly abstract* entities—whether or not identifiable with true propositions—and

[267] See e.g. Kit Fine, 'First-Order Modal Theories III: Facts', *Synthese,* 53 (1982), 43–122, especially p. 46. See also Terence Parsons, 'On Denoting Propositions and Facts', in James E. Tomberlin, ed., *Philosophical Perspectives,* 7: *Language and Logic* (Atascadero, Calif.: Ridgeview, 1993), 454–5.

[268] One philosopher who emphatically takes facts to be causal relata is D. H. Mellor: see his *The Facts of Causation* (London: Routledge, 1995).

yet also as being causal relata: for it seems that only concrete entities, existing in space and time, can enter into causal relations. However, a possible response is to say that we should not, after all, think of facts as causal *relata,* but only as causal *explanantia*: on this view, the fact that this stone is heavy *causally explains* its falling when it is released, but does not *cause* such a falling. Such a view would sit well with the doctrine that facts are just true propositions, for plausibly it is propositions that enter into explanatory relations. But if it is not the *fact* that this stone is heavy which causes its falling, what does cause it? One plausible answer is that what causes the stone's falling—the latter being an *event*—is the stone's state of being heavy (together, of course, with the event of its being released). A *state* of a concrete object is something which belongs to the same ontological category as an *event* involving that object. An event involving an object is a *change* in the properties and/or relations of that object, whereas a state of an object is, as it were, an *unchange* in its properties and/or relations. Changes and unchanges—events and states—are certainly denizens of space and time and thus suitable relata for causal relations, unlike facts, at least if the latter are conceived of as abstracta.

But what of the alternative view of facts, which represents them as being complexes containing concrete entities as constituents—can't this view happily regard facts as causal relata? At least, can't it happily do so in the case of facts *all* of whose constituents it regards as being concrete entities? On such a view, perhaps, the fact that this stone is heavy contains as its only constituents this stone together with either the universal heaviness (conceived of as being 'wholly present' in the stone) or else a heaviness 'trope'. But there is an apparent problem involved in regarding the fact in question, thus conceived, as being the cause of the stone's falling when released. This is that if *the stone itself* is a constituent of the cause of its falling, then it is not clear how the *heaviness* of the stone (whether one regards this property as a universal or as a trope) adds anything to the causation of that effect beyond what is already supplied by the presence of the stone itself: for the stone, one would think, already brings with it all of its properties, including its heavinessso that the latter is surely not additionally needed in order to constitute the cause of the effect in question. It will not help, I think, to try to conceive of 'the stone' in this context as a 'thin', or even 'bare', particular, denuded of some or all of its properties, including its heaviness.[269] For, in the first place, this makes very doubtful sense and, secondly, even if it did make sense, there would then

[269] For the (to my mind dubious) distinction between 'thin' and 'thick' particulars, see Armstrong, *A World of States of Affairs,* 123–6.

be the converse problem of understanding why such a particular was needed as a constituent of the cause in addition to the property of heaviness. In short, thus, either 'the stone' is a 'thick' particular, in which case its property of heaviness appears to be a redundant constituent of the cause, or else it is a 'thin' particular, in which case the stone itself appears to be a redundant constituent of the cause.

The lesson, I suggest, is that those philosophers who have advocated facts as being causal relata have confused them with *states*—that is, with states *of objects,* such as the stone's state of being heavy. We might go so far as to say that they are guilty of confusing *states of affairs* (that is, facts) with *states of objects.* Once this distinction is recognized, the urge to treat facts themselves as concreta may fall away, since we have to hand a perfectly acceptable category of concreta—the states of concrete objects—to do service as causal relata. Facts, then, might be allowed to possess a more 'proposition-like' status—which they arguably betray through the sentential component of our canonical mode of reference to them (as in 'the fact that *P*')—and as such be treated as abstracta. But I reserve judgement on this issue for the time being.

At this point it may be urged that if we want suitably concrete items to play the role of causal relata, we do not need to appeal to what I have been calling 'states of objects'—such as the stone's state of being heavy—since we can appeal instead quite simply to *tropes,* such as the stone's heaviness, conceived as a particular property (as opposed to a universal). As against this, however, it may be contended that what causes the stone to fall on any given occasion is not *the particular heaviness it has,* but rather *its having just such a heaviness*—and this is what its state of being heavy (in just the degree it is) consists in. After all—assuming that it makes sense to say this—if the stone had had a different particular heaviness but one exactly the same in degree, the effect would surely have been the same. Of course, some may feel at this point that our metaphysical distinctions are becoming overly scholastic. On the contrary, I think it is important to distinguish very carefully between the following items, which belong to quite different ontological categories: (1) the particular heaviness of the stone (a *trope* or, as I would prefer to call it, a *mode* of the stone), (2) the stone's state of being heavy in such-and-such a degree (a *state* of the stone), and (3) its being the case that the stone is heavy in that degree (a *fact* or *state of affairs* concerning the stone). Of these three categories of item, I consider that the second is the least problematic, as far as the identity-conditions of its exemplars are concerned. The stone's state of heaviness is individuated by the stone, the degree of heaviness which the stone has, and the time at which (or during which) it has that degree of heaviness. The state continues to exist just so long as that very stone continues to have precisely

that degree of heaviness. As for tropes and facts, though, I think it is much more difficult to formulate principled and unproblematic identity criteria for them.

I have already made this point with regard to tropes in previous chapters (see, especially, Chapter 3 and Chapter 9), but it may help to reiterate it here. Consider the particular heaviness of the stone at a given time (assuming that we can indeed talk meaningfully of such an entity): what are its identity-conditions? Does it continue to exist so long as the stone does not change in its degree of heaviness? One might surmise that this is so. But why shouldn't it be the case that, while not changing in its degree of heaviness, the stone periodically—or perhaps even at every succeeding moment—exchanges one heaviness trope for another, exactly resembling one? There seems to be nothing inherently absurd in this suggestion, granted that we *can* meaningfully talk about the identities of tropes: and yet, at the same time, there seems to be no way in which we could decide, non-arbitrarily, that this suggestion is correct and the previous one false (the previous suggestion being that one and the same trope persists for as long as the stone remains unchanged in its degree of heaviness). If tropes exist and have determinate identity-conditions, then there must be a *fact of the matter* as to which suggestion is correct: and yet it will be a fact which is apparently undiscoverable, even in principle. I prefer to conclude, instead, that it makes dubious sense to talk of the identities of tropes. This doesn't mean, however, that I want to exclude tropes—or, as I prefer to call them, modes—from our ontology altogether, since I am no devotee of the Quinean dictum 'No entity without identity'. I am happy to quantify over tropes, even though I don't believe it makes much sense to think of them as having determinate identities. I quantify over them when I say, for instance, that the stone's state of being heavy in such-and-such a degree consists in its having *a* particular heaviness of such-and-such a degree: for by a 'particular heaviness' here I mean a heaviness trope or mode—and what I am saying is that the stone's state of being heavy consists in its having *some* trope or mode of the appropriate type, without stipulating that it have an *identifiable* such trope or mode.

To this it may be objected that merely saying that the stone has *some* heaviness trope of the appropriate type doesn't exclude the possibility of its having *more than one* such trope: but how many it has at a given time will surely have a bearing on how heavy it is. Surely, it may be said, if the stone had *two* such tropes instead of one, it would be twice as heavy. My answer to this is that the burden of my argument has precisely been that it makes no principled sense to talk of the identity or diversity of indiscernible tropes, nor to talk about counting them—and consequently that the claim just made is simply incoherent (the claim, that is, that if a stone

had two exactly similar heaviness tropes instead of just one, it would be twice as heavy).

4. Facts and Identity

As I remarked a moment ago, I think it is difficult to formulate principled and unproblematic identity criteria not only for tropes but also for *facts*. To see why, let us first consider what a criterion of fact-identity would look like, if we could formulate one satisfactorily. Here we should remind ourselves that, as was explained in Chapter 2, there are two types of identity criterion, 'one-level' and 'two-level' criteria. A *one-level* identity criterion for items of kind *K* takes the form:

(K1) If x and y are *K*s, then $x = y$ if and only if $C_K(x, y)$,

where '$C_K(x, y)$' denotes some appropriate equivalence relation on *K*s (a relation which does not itself involve or depend on *K*-identity, on pain of making the criterion viciously circular). A standard example is the extensionality criterion of set-identity: if x and y are sets, then $x = y$ if and only if x and y have exactly the same members. A *two-level* identity criterion for items of kind *K* takes the form:

(K2) $K(x) = K(y)$ if and only if $C_K(x, y)$,

where '$K()$' is a functional expression (which may usually be read as 'the *K* of . . . ') and '$C_K(x, y)$' denotes some appropriate equivalence relation on the domain of entities to which x and y belong (a domain which may or may not include *K*s). A standard example, from Frege, would be his well-known criterion of identity for directions of lines: the direction of line x= the direction of line y if and only if x and y are parallel. Two-level identity criteria (sometimes called Fregean identity criteria) are, clearly, appropriate in the case of items reference to which by means of functional expressions of a specific form is canonical. This, as we have seen, is the case with facts, to which we typically refer either by means of expressions of the form 'the fact that *P*' or else (my own preference) by means of expressions of the form 'its being the case that *P*'. (Strictly speaking, 'the fact that' is a term-forming operator on sentences, but note that we do sometimes use the locution 'the fact of', as when we say, for example, 'The fact of your presence made no difference', which plainly just means 'The fact that you were present made no difference'—so I shall ignore this nicety here. Of course, if I am right in holding that facts are not determinately individuable, then 'the fact that *P*' cannot, after all, be a functional expression in the strict sense, because a function must have just one value

for each of its possible arguments: but, plainly, it would be premature to raise this objection now.)

I do not wish to rule out without more ado the possibility that one might be able to frame a one-level criterion of identity for facts—and, indeed, we shall look at just such a proposal shortly. But, clearly, given that we apparently have no systematic way of referring to facts other by means of terms which exploit whole *sentences* (or their equivalents) in their construction, the search for a two-level criterion looks inherently more promising. A two-level criterion of fact-identity may be expected to take something like the following general form:

(F2) The fact that P = the fact that Q if and only if $R(P, Q)$,

where '$R(P, Q)$' states some suitable equivalence relation on the domain of entities to which P and Q belong. What are P and Q, though? Presumably, they are *propositions* (taking the standard view that a proposition is what is expressed by a whole sentence). But propositions may already look too close to facts for comfort in this context. If facts just *are* true propositions, will not (F2) just be circular? Not necessarily: not if $R(P, Q)$ does not involve or depend on propositional identity. It would not do, thus, to let $R(P, Q)$ be, quite simply, the identity (that) P = (that) Q. (I set aside here any worries one might have about the syntactic propriety of identity statements of this form.) But it might do to let $R(P, Q)$ be, say, *Necessarily*(P if and only if Q). That, indeed, is one proposal which some philosophers have felt sympathy for—the proposal that:[270]

(F2.1) The fact that P = the fact that Q if and only if it is necessarily the case that P if and only if Q.

On reflection, however, (F2.1) is an implausibly coarse-grained principle for individuating facts. It makes the fact that 2 + 2 = 4 identical with the fact that a triangle has three sides and it makes the fact that Mars is red identical with the fact that Mars is red and 2 + 2 = 4. Worse still, if Spinozism is correct and *all* truths are necessary truths, then (F2.1) makes the fact that Mars is red identical with the fact that Venus is white—indeed, it collapses all facts into one. But no satisfactory criterion of identity for a kind of entities K should make the identity-conditions of Ks depend upon a general metaphysical thesis of this sort, especially a thesis which is not manifestly absurd.

Another difficulty with (F2.1) is that since its right-hand side turns out to be *true* when a self-contradiction is substituted for both 'P' and 'Q',

[270] For discussion of a closely related proposal, see Fine, 'First-Order Modal Theories III: Facts', 58 ff.

(F2.1) apparently implies that such a self-contradiction is *true*. Thus, since it *is* necessarily the case that Mars is both red and not red if and only if Mars is both red and not red, (F2.1) implies that the fact that Mars is both red and not red is identical with the fact that Mars is both red and not red. But from this we can immediately infer that the fact that Mars is both red and not red *exists* and consequently that it is *true* that Mars is both red and not red (unless, perhaps, we adopt some form of so-called 'free' logic, in which the inference from '$a = a$' to '$(\exists x)(x = a)$' is not valid). One possible response to this problem might be that what it demonstrates is precisely that facts do, after all, have to be thought of as true propositions or—a somewhat similar proposal—as states of affairs which 'obtain'. The idea would be that an identity criterion for *propositions* along the lines of (F2.1) would be untroubled by the fact that it would imply the existence of the *proposition* that Mars is both red and not red, because propositions are necessarily existent abstract entities which exist whether or not they are true. (Similarly, some philosophers think of 'states of affairs' as necessarily existent entities which exist whether or not they 'obtain' and think of facts as those states of affairs which do 'obtain'.) So, then, it may be urged that to talk of 'the fact that *P*' is both to refer to a proposition—the proposition that *P*—and (implicitly) to assert that that proposition is true. However, whatever the merits of this kind of proposal, it seems clear that even a criterion of identity for propositions along the lines of (F2.1) still falls foul of the other objections mentioned above.

Those philosophers who like to think of facts as *complexes*—whether containing concrete or only abstract entities as their constituents—may diagnose the problems with (F2.1) as arising from its ignoring the internal constitution and structure of facts. Even facts which, as they might put it, exist in exactly the same possible worlds can, they may urge, be quite distinct from one another, in virtue of differences between their constituents and/or structure. What is needed, according to this view, is a criterion of fact-identity which perspicuously displays the identity of a fact as depending upon the identities of its constituents and the way in which those constituents are structured in the fact. At least in the case of 'atomic' facts, it may be contended, this requirement presents no difficulty. Taking the fact that Mars is red (say) to be, for the sake of argument, an atomic fact, it may be supposed that its constituents are evidently two in number, though one may dispute the nature of those constituents. One constituent is either Mars itself—a concrete object—or else something abstract which somehow represents Mars, such as Mars's individual essence or individual concept. The other constituent is a certain property, redness—either a universal or else a trope (Mars's particular redness). Let us suppose, again for the sake of argument, that the constituents are Mars itself and the universal

redness. Then, it will be said, what makes the fact that Mars is red a numerically distinct fact from the fact that Venus is white is that the two facts contain as constituents two *different* concrete objects and two *different* properties. Indeed, something like the following criterion of fact-identity is implied:[271]

(F1.1) If x and y are facts, then $x = y$ if and only if x and y contain the same constituents structured in the same way.

(Talk of structure may, of course, seem idle in the case of a non-relational atomic fact such as the fact that Mars is red is here assumed to be, but becomes vital if one is to distinguish, say, between the fact that Tom loves Mary and the fact that Mary loves Tom.) Observe that I have formulated (F1.1) as a *one-level* identity criterion, because that seems most natural in the present case. It is not clear, indeed, how one might try to capture the same idea in a two-level criterion. The one-level character of (F1.1) is, however, immediately a source of difficulty, when we consider it in conjunction with our previous observation that the canonical mode of reference to facts involves terms which exploit whole *sentences* (or their equivalents) in their construction: terms of the form 'the fact that *P*' or 'its being the case that *P*'. For, given such a term, how do we ascertain in a principled way what *are* the constituents and structure of the fact referred to by that term?

5. Facts and Their 'Constituents'

This problem with (F1.1) may be illustrated as follows. Let us start with the assumption that the fact that Mars is red is an 'atomic' fact whose 'constituents' are Mars and redness, so that this fact may be represented by the ordered pair <Mars, redness>.[272] (This, of course, is already to ignore the room for disagreement that there is over whether, for instance, it is Mars itself or only something like Mars's individual essence which is a constituent of the fact in question.) Observe next that 'Mars is red' is provably equivalent—given the axioms of standard set theory—to '{Mars} = {x: x is red and x = Mars}', that is, to 'The unit set of Mars is identical with the set of things which are red and identical with Mars'. This being so, let us then ask whether, according to (F1.1), the fact that

[271] For discussion of this sort of approach, see ibid. 57 ff.

[272] For an example of this quite popular approach to the representation of facts and states of affairs, by means of ordered n -tuples, see Barry Taylor, *Modes of Occurrence* (Oxford: Blackwell, 1985), 40 ff.

Mars is red is the *same* as or *different* from the fact that the unit set of Mars is identical with the set of things which are red and identical with Mars. Now, it might be contended that the constituents of the latter fact are not Mars and redness, but rather the unit set of Mars, the set of things which are red and identical with Mars, and the relation of identity, making the facts in question different according to (F1.1). On this view, the fact that the unit set of Mars is identical with the set of things which are red and identical with Mars is represented by the ordered triple <{Mars}, {x: x is red and x = Mars}, identity>. Suppose that this view is accepted as correct. (We shall explore an alternative view in a moment). Now, since Mars *is* red, the unit set of Mars just *is* the set of things which are red and identical with Mars: {Mars} = {x: x is red and x = Mars}. So it seems that, on this view, the constituents of the fact that the unit set of Mars is identical with the set of things which are red and identical with Mars are nowise different from the constituents of the fact that the unit set of Mars is *self-identical*—the fact that {Mars} = {Mars}—whence it appears that, according to (F1.1), these 'two' facts are really just one and the same, since both are represented by the ordered triple <{Mars}, {Mars}, identity>. However, that is surely an untenable judgement, because the existence of the fact that the unit set of Mars is identical with the set of things which are red and identical with Mars implies the existence of the fact that *Mars is red,* which is surely *not* implied by the existence of the (trivial) fact that the unit set of Mars is self-identical. So let us abandon the view which led to this conclusion and turn to another.

Some philosophers may hold that the constituents of the fact that the unit set of Mars is identical with the set of things which are red and identical with Mars are *not,* as previously proposed, the unit set of Mars, the set of things which are red and identical with Mars, and the relation of identity. In particular, they may hold this because they consider that set-abstracts, such as '{Mars}' and '{x: x is red and x = Mars}', along with definite descriptions, are not singular referring terms but, rather, covert devices of quantification.[273] Accordingly, they may hold that the fact that the unit set of Mars is identical with the set of things which are red and identical with Mars is a *general* rather than an *atomic* fact, and for that reason different from the fact that Mars is red. In consistency, however, such philosophers are also bound to judge that the fact that Mars is red is different from the fact that *something is red and identical with Mars,* on the grounds that the former is 'atomic' and the latter 'general'. But this is a strange and uncompelling verdict, given that the sentences reporting these facts—'Mars is red' and '($\exists x$)(x is red and x = Mars)'—are not only provably

[273] See further Neale, 'The Philosophical Significance of Gödel's Slingshot'.

equivalent but do not even differ at all in respect of their non-logical vocabulary. Furthermore, we have to ask these philosophers why the unit set of Mars, for instance, should *not* be a 'constituent' of the fact that the unit set of Mars is identical with the set of things which are red and identical with Mars, merely because the set-abstract '{Mars}' is, allegedly, not a singular referring expression. Why should this *linguistic* observation, even if correct, have any bearing on the *ontological* question of what the 'constituents' of this fact are? Even if '{Mars}' does not *refer,* in some technical sense, to a particular set, it is none the less clear that it does *uniquely designate* a particular set, which is also uniquely designated by '{x: x is red and x = Mars}'. Why should we say that the 'constituents' of a fact include items referred to by expressions contained in a sentence reporting that fact but not necessarily items uniquely designated by expressions contained in that sentence? It seems to me that these and similar considerations demonstrate the vacuity of the notion that facts are complexes with uniquely specifiable constituents which, together with their 'structure', determine the identities of those complexes. There is, I suggest, no principled way of determining the supposed constituents of a fact from our canonical mode of reference to a fact by means of a term exploiting a whole sentence in its construction, because we have no right to suppose that we can 'read off' the supposed constituents of a given fact from the syntax and semantics of the sentence exploited to make reference to it. We cannot even tell whether a fact is an 'atomic' fact by these means. Why, for instance, should we suppose, as we have been doing, that the fact that Mars is red is an 'atomic' fact? Merely because it is referred to by means of a simple subject–predicate sentence? Mars is red, after all, just because its surface is red. Should we say, then, that the fact that Mars is red is 'really' the fact that Mars has a surface which is red—which, one might suppose, is *not* an 'atomic' fact? Who can answer such questions in a principled way? The very idea that there are 'atomic' facts, representable by ordered *n*-tuples of entities, such as <Mars, redness> or <Brutus, Caesar, killing>, seems to be nothing more than the figment of a logician's over-tidy mind. The real world does not come to us so neatly parcelled up.

Notice that I come to this sceptical conclusion even without benefit of appeal to what is perhaps the most notorious problem of all besetting the view that facts are structured complexes of constituents: the problem of what it is that binds the supposed constituents into the fact.[274] For example, on the assumption that the fact that Mars is red is an atomic fact containing Mars and redness as its sole constituents, it is allegedly

[274] An objection along these lines may be traced back to F. H. Bradley: see Olson, *An Essay on Facts,* ch. 3.

representable by the ordered pair <Mars, redness>: but then we have to ask what is needed for the existence of the fact that Mars is red over and above the existence of Mars and redness themselves, whose existence suffices for the existence of that ordered pair but not for the existence of the fact which it supposedly represents. If we return the answer that what is additionally needed is that Mars be such as to *exemplify* redness, then the following difficulty arises. Clearly, it will not do to try to represent this addition by including, as a further constituent of the fact that Mars is red, the relation of *exemplification,* since it is equally clear that the ordered triple <Mars, redness, exemplification> can exist without its being a fact that Mars is red (exemplifies redness). No further addition to the constituents of the fact and no further specification of its structure will do the trick. For what is needed to turn a situation in which the fact that Mars is red does not exist, even though Mars and redness do exist, into a situation in which the fact that Mars is red *does* exist, is none other than this: that it be the case—a fact—that *Mars is red.*

What this shows, I take it, is that *nothing whatever* 'binds' the supposed constituents of a fact into that fact, because facts don't *have* 'constituents' in any genuine sense. It may be true enough that if the fact that Mars is red exists, then Mars and redness themselves exist—but *that* doesn't suffice to warrant talk of Mars and redness as being 'constituents' of that fact. (After all, it is equally true that if the fact that Mars is red exists, then {Mars} and many other things also exist, which most friends of facts would *not* want to say are 'constituents' of that fact.) Objects such as *walls* genuinely have constituents—in their case, objects such as bricks: a wall exists just in case some bricks are cemented together in an appropriate arrangement. Here we can specify how the constituent bricks are to be related, in order for a wall consisting of them to exist, without having to say, quite vacuously, that the bricks have to be *so related that a wall consisting of them exists.* But something analogous to the latter is precisely what we *are* reduced to saying about facts and their alleged 'constituents': that, for example, the supposed constituents of the fact that Mars is red—Mars and redness—have to be so related that Mars *is* red, that is, so related that the fact that Mars is red exists. This, I believe, is the final *reductio ad absurdum* of the doctrine that facts have 'constituents'—and thereby the *reductio* also of the putative identity criterion (F1.1).

6. Facts and Truth

Neither of the proposed criteria of fact-identity that I have looked at turns out to be at all promising. Nor does it seem likely that anything better can

be found to replace them. I think that we simply do not have any firm grip on the notion of fact-identity, either pre-theoretically or after sustained philosophical reflection. This is not, however, a reason for abandoning all talk of facts as empty or meaningless. I think we still need to include facts in our ontology, not least as truth-makers. But do facts need determinate identity-conditions in order to play this role? Only, perhaps, if truth is thought to consist in one-to-one correspondence between truth-bearers and truth-makers. For where there is one-to-one correspondence there must certainly be *countable* and therefore *individuable* items of some kind. However, the idea that there should be one distinct truth-maker for each distinct truth-bearer and vice versa is surely quite unwarranted. All that matters is that every truth-bearer should have *a* truth-maker—that *some* fact or facts should make it true.

However, if we are to include facts in our ontology, where in the world are we to *put* them—if, indeed, they are to be put 'in' the world, in any sense at all? Here I have a proposal. This is that facts are akin, ontologically, to what I earlier called 'modes' (more popularly known as 'tropes'). A mode is, quite literally, a particular *way* some object is: for instance, Mars's redness is Mars's way of being coloured. Likewise, Mars's roundness is its way of being shaped. Facts, I suggest, are ways *the world* is—where by 'world', now, I mean not Wittgenstein's 'totality of facts' ('everything that is the case') but rather something, quite literally, more substantial: the whole to which all existing objects belong as parts, whether these be concrete objects existing in space and time or abstracta such as numbers and sets—in short, the 'universe', as I earlier called it. Thus, it is true that Mars is red because there is a way the world is that makes it true. But there is not some single, identifiable item, or ingredient of reality, which makes it true that Mars is red. At least, we have no need to suppose this and, if I am right, no warrant for doing so either. I am precisely *not* saying, of course, that it is just the world as a whole, not any aspect of it, which makes it true that Mars is red: for facts, according to my proposal, just *are* 'aspects' of the world—ways it is. But we seek in vain if we seek to identify a unique aspect of the world which alone makes it true that Mars is red. We can say, if we like, that it is the fact that Mars is red, or its being the case that Mars is red, that makes it true that Mars is red: but we delude ourselves if we think that by talking in this fashion we have fastened upon some uniquely identifiable item or entity which alone makes it true that Mars is red.

Observe that adopting this position precludes us from defining a proposition or sentence *P* as being true if and only if the way *P* represents the world as being is a way the world is. For such a definition invokes not only *quantification* over ways the world is (which I am happy to allow), but also

identity between such ways. This is because the 'is' on the right-hand side of the biconditional expressing the proposed definition is clearly the 'is' of identity. Formally, the definition in question could perhaps be expressed in something like the following fashion:

(T) P is true $=_{df}$ $(\forall x)$(if x is a way P represents the world as being, then $(\exists y)$(y is a way the world is and $x = y$)).

There are all sorts of problems involved in understanding what (T) could really mean, besides the problem of understanding what to make of identity between 'ways'—not least because it invokes the obscure notion of 'representation'—but the identity problem is problem enough to defeat (T) or anything very much like it. Indeed, nothing in my suggestion that facts are ways the world is and are the truth-makers of true propositions holds out any prospect for a *definition* of truth at all, my own suspicion being that the concept of truth is a primitive and indefinable one.[275]

But what, it may be asked, about the view that facts just *are* true propositions—can't this be combined with the doctrine that facts are ways the world is to produce a remarkably simple definition of truth? Can't we simply say, on this view, that a proposition is true if and only if it *is* a way the world is? No, because this again invokes identity between ways, as becomes clear if one states the proposed definition formally, as follows:

(T*) P is true $=_{df}$ $(\exists x)$(x is a way the world is and $P = x$).

(T*) does indeed have the advantage over (T) that it avoids the obscure notion of *representation,* but it still falls foul of the problem of identity. Moreover, (T*) has additional problems of its own. For instance: what, according to (T*), would a *false* proposition be, assuming that a proposition is false if and only if it is not true? According to (T*), a proposition is not true if and only if it is not identical with any way the world is. But if a false proposition is not a way the world is, what *is* it—if indeed such an entity can exist at all on this view? It will hardly do to say that a false proposition is a way the world is *not,* for it is not at all clear what one could mean by that. The problem is, then, that this view at best seems to treat true and false propositions as entities belonging to different ontological categories and at worst seems to deny existence altogether to false propositions. But if we deny their existence, what are we to say is the content of a false thought?

As for the question of whether 'ways the world is' are items *in* the world, my answer would be that they are not 'in' it in any sense which implies

[275] I sympathize, then, with much that Donald Davidson has to say in his 'The Folly of Trying to Define Truth', *Journal of Philosophy,* 93 (1996), 263–78.

spatiotemporal location, nor 'in' it in the sense of being included amongst the things which collectively constitute what I have been calling 'the world'—for they are not themselves *things* but *ways things are*. Rather, facts are 'in' the world somewhat as modes are 'in' the objects which possess them—as we might put it, facts are 'adjectival upon' the world, somewhat as modes are 'adjectival upon' objects. Where facts differ from ordinary modes is that, rather than being ways *particular* things are, they are ways *things in general,* or *things as a whole,* are. This is what it seems we have to say if we accept the conclusion defended earlier that no particular objects can be identified as the exclusive 'constituents' of any fact. And now we may remark that Wittgenstein's contention that the world is 'the totality of facts, not of things' is akin to the contention of some trope theorists that objects are bundles or collections of tropes—and mistaken for a similar reason, namely, because both views try to substitute for something substantial a collection of insubstantial entities which, in reality, depend for their existence upon the existence of the very entities for which they are being substituted.

12 The Puzzle of Existence

Many abstract entities—such as numbers, propositions and some sets—appear to be necessary beings, in the sense that they exist 'in every possible world'. (I say only some sets, because sets whose members are contingent beings are likewise contingent beings.) Indeed, possible worlds themselves, conceived of as abstracta—for instance, as maximal consistent sets of propositions—surely exist 'in every possible world'. On the other hand, many philosophers, myself included, have a strong intuition that abstract entities are, in some sense, ontologically posterior to concrete entities—understanding the latter to be entities existing in space and/or time. This poses a problem, because concrete entities—and, indeed, space and time themselves—appear to be contingent beings. It may seem, on the face of it, unpromising to contend that necessary beings can depend for their existence upon contingent beings. Hence, unless we can demonstrate that there is no problem about this, we must either give up the claim that abstract entities are (always) ontologically posterior to concrete entities, or give up the claim that at least some abstract entities are necessary beings, or else argue for the existence of at least some necessarily existent concrete beings. (There is, of course, one other theoretical alternative—to deny the existence of abstract entities altogether: but this alternative is quite as difficult to defend as the others and I look upon it as a last resort.) In this, the concluding chapter of the book, I shall attempt to resolve this conundrum in the course of pursuing an answer to that perennially puzzling metaphysical question, 'Why should there be anything at all?'.

1. Van Inwagen's Question

In a recent paper, Peter van Inwagen invites us to consider *why there are any beings.*[276] Van Inwagen uses the term 'being' as a synonym for 'concrete object', but he is silent on what 'concrete' means and offers no explicit definition of the term 'object'. My own view, as set forth in Chapter 2, is that

[276] See Peter van Inwagen, 'Why Is There Anything At All?', *Proceedings of the Aristotelian Society,* supp. vol. 70 (1996), 95–110.

an 'object' is any item possessing determinate identity-conditions, so that stars, animals, tables, battles, numbers, and sets are all plausible candidates for membership of the category of objects (though whether any items of these kinds actually *exist* is another matter). Amongst non-objects I include such items as waves (of the seaside variety), grins, and facts. These are items which are candidates for existence (it makes perfect sense to say that there are grins on the boys' faces, or waves on the sea, or lots of facts that I don't know); but they cannot apparently be assigned determinate identity-conditions in a principled and non-arbitrary way. As for *concrete* objects, I take these to be objects which exist in space and/or time, as I explained in Chapter 10. Furthermore, I consider that to say that something 'exists in time' is to say that tensed predications of intrinsic properties are true of it—that it now has, did have, or will have some intrinsic property. *Abstract* objects (in the sense of *non-concrete* objects) are subjects only of tenselessly true predications, as far as their intrinsic properties are concerned—as when it is said that 4 is (tenselessly) the square of 2. This, at any rate, is the view time-bound existence that I defended in Chapter 4.

Van Inwagen assumes—and I am strongly inclined to agree with him—that at least some abstract objects are necessarily existent, or exist in all possible worlds. But he goes on to say that 'if *everything* were an abstract object, . . . there is an obvious and perfectly good sense in which there would be nothing at all', adding: 'When people want to know why there is anything at all, they want to know why *that* bleak state of affairs does not obtain'.[277] I am happy, at least for the time being, to allow van Inwagen his sense of what it would mean for there to be 'nothing at all'. But a further consideration is this: van Inwagen seems to assume that, given that it makes sense to speak of abstract objects at all, it is at least intelligible to talk about a world in which *only* abstract objects exist. However, one might take the view that abstract objects necessarily depend for their existence upon concrete objects: and in that case, one would either have to give up the assumption that at least some abstract objects exist in every possible world or else have to conclude that at least some concrete objects exist in every possible world. Of course, the latter conclusion would be interesting, because it would imply that van Inwagen's 'bleak' state of affairs is impossible. It is pertinent to note here the following remark of van Inwagen's:

> I can say only that it seems to me hopeless to try to devise any argument for the conclusion that it is a necessary truth that there are beings [= concrete objects]

[277] Ibid. 96.

> that is not also an argument for the conclusion that there is a necessary being. I simply have no idea of how one might even attempt that.[278]

But from my immediately preceding comments one can extract a possible line of argument of precisely the sort that van Inwagen seems to find inconceivable. To wit: argue first that at least some abstract objects exist in all possible worlds (for instance, the natural numbers) and next that abstract objects always depend for their existence upon concrete objects; from this conclude that at least some concrete objects exist in all possible worlds (but not necessarily the *same* concrete objects in all possible worlds and so not necessarily any 'necessary being'). I shall return to this line of argument later. Before doing so, however, I want to comment briefly on the remainder of van Inwagen's paper.

2. Van Inwagen's Probabilistic Argument

I am inclined to agree with van Inwagen that any attempt to argue that there is a necessarily existent being (concrete object)—for instance, by deploying some version of the Ontological Argument—is doomed to failure. However, having given up the hope of showing that a necessary being exists, van Inwagen tries something else much more novel: he tries to show that *there is a zero probability of there being nothing at all*. His argument is remarkably brief and has four premisses: (1) there are some beings; (2) if there is more than one possible world, there are infinitely many; (3) there is at most one possible world in which there are no beings; and (4) for any two possible worlds, the probability of their being actual is equal. The argument proceeds as follows. If there is just one possible world ('Spinozism'), then, by (1), it is necessary that there are some beings and so the probability of there being none is 0. If there is more than one possible world, then, by (2), there are infinitely many, all of which are equiprobable (by (4)), so that each of these worlds has a probability of 0. Therefore, by (3), the probability of there being no beings is, once again, 0.

Van Inwagen surmises that premiss (4) is the one that will be challenged—and, indeed, it does seem odd to suppose that, for example, a world consisting purely of pink elephants floating in custard is inherently no less probable than the world we actually find ourselves in. The rest of van Inwagen's paper is devoted to supporting premiss (4). I shall not comment on this part of his paper in much detail, though I do have two general worries to voice and one more specific objection. First, I observe that

[278] Ibid.

van Inwagen's premisses (2) and (4) by themselves have the somewhat alarming consequence that the probability of this, the actual world is either 1 or 0. Hence, on van Inwagen's principles, if 'Spinozism' is false then it is as improbable as anything could be that the world is as we actually find it to be. This seems a remarkably strong conclusion to be able to draw from supposedly a priori premisses.

Secondly, I remark that, to the extent that van Inwagen's defence of premiss (4) appeals to our alleged 'capacity for determining a priori that some states of some systems are of equal probability',[279] it looks rather vulnerable. The assumption that we have such a capacity has notoriously given rise to paradox in the past, especially in cases involving an infinite range of alternative possibilities. For instance, there is Bertrand's paradox, posed by the following problem: if a chord of a circle is drawn at random (that is, in any one of a set of exhaustive and mutually exclusive equiprobable alternative ways), what is the probability that its length will be less than that of the side of the inscribed equilateral triangle? The trouble is that there are several *different* but equally plausible ways of describing the supposed set of equiprobable alternatives, each of which is associated with a different answer to the problem.[280] Van Inwagen may think that no similar problem could arise in the case of possible worlds; but that seems to presuppose that 'worlds' have well-defined identity-conditions, such that collectively they constitute a unique way of dividing up the 'space' of metaphysical possibility into an infinite set of exhaustive and mutually exclusive alternatives—and this is something which I shall call into question in due course.

But, in any case, there is another objection that one can raise against van Inwagen's argument, this time directed against premiss (3). Van Inwagen defends (3) on the grounds that

> there is nothing in virtue of which two worlds that contained only abstract objects could be different. If two worlds are distinct, there must be some proposition that is true in one and false in the other. If, therefore, there are *two* worlds in which there are no beings, there must be some proposition such that both that proposition and its denial are consistent with there being no concrete beings . . . But it's very hard to see how there could be a proposition that met this condition—much less to come up with a (possible) example of one.[281]

However, even allowing that there is *a* world which contains only abstract objects—something which I shall challenge later—it is unclear how one could justifiably claim that there is only one such world: first, because this

[279] Ibid. 103.

[280] See J. M. Keynes, *A Treatise of Probability* (London: Macmillan, 1921), 47–8.

[281] Van Inwagen, 'Why Is There Anything At All?', 101.

again presupposes that worlds have well-defined identity-conditions, and secondly, because it seems to presuppose that *all* abstract objects are necessary existents. If some abstract objects are only contingent existents, then van Inwagen must allow that they exist in some worlds but not others—but then why not in some worlds but not others in which only abstract objects exist? We know that there *can* be abstract objects which are contingent existents, for *sets* are abstract objects and are contingent if their members are, since they exist only if their members do.

3. Another Approach to the Question

Now let me return to the quite different approach, canvassed earlier, to the question of why there is anything at all. Recall that, as van Inwagen understands this question, it is the question of why his 'bleak' state of affairs doesn't obtain—this being a world in which there are no concrete objects, but at most only abstract objects. Now, suppose we could show that there *couldn't* be a world containing only abstract objects, perhaps by arguing that abstract objects necessarily depend for their existence upon concrete objects: what would follow? Clearly, it would follow that van Inwagen's 'bleak' state of affairs couldn't obtain. And yet, in a perfectly clear sense, this wouldn't suffice to show that it was *necessary* for something concrete to exist: for we wouldn't have foreclosed the possibility that *nothing at all*—nothing either concrete or abstract—might have existed. To foreclose that possibility, it seems, we would need also to show that at least some objects, abstract or concrete, exist in every possible world. For instance, it would suffice to show that the natural numbers exist in every possible world. So here is a line of thought worth exploring: on the one hand show that certain abstract objects, such as the natural numbers, exist of necessity, and on the other hand show that these objects depend for their existence upon there being concrete objects of some sort.

One way of pursuing this line of thought is as follows. We could begin by contending that the only possible abstract objects are *universals* and *sets*—sets, of course, being *particulars* rather than universals.[282] I myself find this contention plausible—and certainly it has the attraction of being parsimonious. From this initial contention it would follow that all 'other'

[282] The thrust of my argument will not be deflected if, as some few philosophers hold, sets are in fact *universals* rather than particulars. It is true, incidentally, that some philosophers suggest that sets some or all of whose members are concrete objects are themselves concrete objects: see e.g. Maddy, *Realism in Mathematics,* 59. But this complication, too, does not threaten to undermine the argument which follows—so I shall be assuming that all sets are in fact *abstract particulars.*

abstract objects, such as *propositions, possible worlds,* and *numbers*—assuming them to exist and to be 'objects'—are themselves either universals or sets. Some philosophers take possible worlds to be sets of propositions while others take propositions to be sets of possible worlds—though, clearly, it would be circular to adopt both positions at once. Quite plausibly, however, one could regard possible worlds as (maximal consistent) sets of propositions while regarding propositions as universals. (I shall challenge this view of possible worlds in the next section, but for the time being we may go along with it.) One reason for regarding propositions as universals would be this: it is plausible to take a one-place predicate, such as '——is red', as being the linguistic expression of a universal and it is plausible to take a whole sentence, such as 'Mars is red', as being the linguistic expression of a proposition—but a whole sentence can be regarded, in effect, as a zero-place predicate, whence it seems appropriate to regard what it expresses as being akin, ontologically, to what is expressed by a one-place predicate, that is, a *universal*. Of course, not *every* one-place predicate plausibly expresses a real universal—for instance, disjunctive predicates plausibly do not—but provided that *some* do, that may be enough to sustain the line of reasoning just proposed. Anyway, I shall return to the matter of propositions and possible worlds later. Of more immediate concern is the status of *numbers*. According to our initial contention these too, assuming them to exist, will have to be either universals or sets. That, however, is in line with mainstream opinion amongst mathematical realists. Most hold that numbers are sets. I myself hold that they are universals. My view, as I explained in Chapter 10, is that numbers are *kinds* of sets—that is, kinds whose particular instances are sets of appropriate cardinality. Thus, by this account, the number 2 is the kind of two-membered sets.

The next step would be to defend an 'Aristotelian' or 'immanent' realist account of universals, which requires them to have particular instantiations. This, again, is a view to which I have committed myself in earlier chapters. (Note that I take 'Aristotelian' or 'immanent' realism about universals only to imply that actually existing universals must actually be instantiated, not that they must in some sense be 'wholly present' in their instances, at least if 'being wholly present in' is supposed to denote some sort of *spatial* property or relation. Note, too, that I interpret immanent realism as implying, in the case of universals whose instances are concrete particulars, only that such instances exist at *some* time and place.) Now, if immanent realism is correct, then the only universals which could in principle exist in a world devoid of concrete particulars would be universals whose instances were abstract particulars. And we have assumed that the only abstract particulars are *sets*. Sets, however, can only exist in worlds

in which *their members* exist. The only apparent exception to this claim is provided by *the empty set,* because it doesn't *have* any members. But the empty set seems to me as good an example as we can get of a purely fictional entity, so I shall be assuming that no such object exists.[283] As a consequence of this, I must reject the existence of so-called 'pure' sets, that is, sets which require for their existence only the existence of other sets. However, if only 'impure' sets exist, then *non*-sets must exist in addition to sets. Of course, *universals* are non-sets, but there is an obvious difficulty in supposing that there might be a world in which the only non-sets are universals *whose only particular instances are sets.* For in such a world the sets depend for their existence upon the universals and the universals depend for their existence upon the sets, creating a vicious circle which deprives both universals and sets of the possibility of existence. I conclude that there cannot be a world which *only* contains universals and sets and hence cannot be a world in which only abstract objects exist. However, the *numbers* are abstract objects and arguably exist in every possible world—whence it follows that concrete objects must exist in every possible world.

But there is an obvious *prima facie* problem with this conclusion: in a world containing only finitely many concrete objects (if such a world is possible), it looks as though there wouldn't be 'enough' concrete objects to secure the existence of all the natural numbers. (On my own account of numbers, each number is a universal which must have at least one particular instance, in the form of a set of appropriate cardinality.) And yet the idea that only the first *n* natural numbers might exist in a certain world is hard to swallow. Surely, if any natural number exists, they all do.

[283] It is not clear to me that the empty set even has well-defined identity-conditions. A set has these only to the extent that its members do—but the empty set has none. *Many* things have *no* members: what makes just *one* of these qualify as 'the empty set'? Indeed, what distinctive properties *does* 'the empty set' have: how would we recognize it if we came across it? How do we know, for instance, that *Mars* or *Napoleon* is not 'the empty set'? Presumably, because neither of these is a *set.* But why isn't either of them a set? The obvious answer is: because neither of them has any *members,* in the set-theoretic sense of 'member'. But, of course, 'the empty set' is supposed not to have any members either, by definition: so what makes *it* a 'set'? It is quite unclear to me what principled answer can be given to this question. Against me, however, Thomas Baldwin has complained that my rejection of the empty set commits me to a non-standard theory of arithmetic 'which makes no reference to the number 0': see his 'There Might Be Nothing', *Analysis,* 56 (1996), 231–8, especially p. 237. Well, so be it. But it seems to me that our intuitions about the necessity of arithmetical truths in no way hinge upon uncritical acceptance of the existence of 'the number 0'. It is not as though no sense can otherwise be made of such arithmetical propositions as '1 − 1= 0'. On the contrary, we typically explain this to a child as meaning 'One take away one leaves nothing'—and the thought that 'nothing' denotes a special kind of something is one fit only for the humorous works of a Lewis Carroll.

However, as I explained in Chapter 10, this need not be a problem, if one can distinguish between an object and its unit set: for in that case, it suffices that just *one* concrete object should exist in order for an infinite number of particulars to exist. For example, suppose that that single concrete object is *myself*: then, in addition to myself, we have my unit set, the unit set of my unit set, and so on to infinity. Thus, each of the natural numbers has a set of appropriate cardinality instantiating it: for instance, the number 2 is instantiated by the set whose members are myself and my unit set. It appears, then, that we need not worry about there being worlds containing some, but not enough, concrete objects for (all) the natural numbers to exist in those worlds. (What if we *can't* distinguish between an object and its unit set? Then a world containing at least *two* concrete objects contains a denumerable infinity of particulars. Call the two concrete objects *a* and *b*. Then a third particular is the set {*a, b*}, a fourth particular is the set {*a,* {*a, b*}}, a fifth is the set {*a,* {*a, b*}, {*a,* {*a, b*}}}, and so on. At no stage do we need to appeal to unit sets.)

However, we still haven't shown that the natural numbers *do* in fact exist in every possible world. But what would it be for them *not* to exist in a world? A world in which they didn't exist would be a world in which, for instance, it was not true that 2 plus 2 equals 4. Of course, some philosophers of mathematics believe that this is not really true even in *this* world, because they don't think that mathematical objects exist anyway.[284] It may not be too difficult to live with the thought that none of mathematics is true—it might still be *useful* (a useful fiction). However, someone like myself, who believes in universals and furthermore believes that the natural numbers *are* universals, is not going to be persuaded by a fictionalist account of mathematics. I firmly believe that the natural numbers do really exist in this, the actual world. The question then is: given that I believe this, can I make sense of the thought that these very objects, the natural numbers, do *not* exist in some possible world? To suppose so is to suppose that there *are* mathematical truths in this world which do not hold in some other world. But such a position is doubtfully coherent. It may be coherent to hold, with the fictionalist, that mathematical propositions are *never* true, in this or any other world. What seems hard to make sense of is the thought that mathematical propositions are only *contingently* true. But if they are necessarily true, appropriate truth-makers for them must exist in every possible world—and on my sort of account of the nature of the natural numbers, this means that *concrete* objects, too, must exist in every possible world.

[284] See e.g. Hartry Field, *Science without Numbers.*

4. Possible Worlds

It might be thought that our task is in fact rather more straightforward than I have represented it as being, for the following reason. It might be held that a world in which there is literally *nothing at all*—no concrete or abstract objects whatever—is metaphysically impossible, because even a world putatively containing no space and time and no mathematical objects (numbers and sets) would at least contain *facts*: for instance, the fact that there were none of these other things. If it could also be maintained that facts either *are* universals (perhaps by identifying them with true propositions and taking the latter to be universals) or else necessarily contain universals as constituents, then it could be argued that any world in which facts exist must contain universals; and it could thus be concluded, via an appeal to 'Aristotelian' realism, that particulars would have to exist in that world and that some of these would have to be concrete particulars (on the grounds that the only possible abstract particulars are sets and that these must be 'impure'). This line of argument would avoid any special appeal to mathematical objects and the necessity of mathematical truths. Its key idea is just that a world in which nothing is the case (in which there are no facts) would be no world at all. However, there is a problem with this line of argument, I think, which is that it seems to treat facts as if they were themselves *objects* of a certain kind (either universals or complex objects containing universals as constituents). But that facts are not objects is a claim I made in Chapter 11 and I want to stick to it here.

As we recalled in Chapter 11, Wittgenstein famously said that the world is 'the totality of facts, not of things': it is 'everything that is the case'.[285] On this view, it seems, no 'possible world', including the 'actual' world, is itself a 'thing'—an *object*. As far as *possible* worlds are concerned, I think that this verdict is correct—though, as I explained in Chapter 11, I differ from Wittgenstein in taking '*the* world' to denote precisely that object or 'thing' which is the sum of all existing objects or 'things'. If possible worlds are totalities of possible facts—'maximal possible states of affairs' or, in the language of Chapter 11, maximal *ways* the world could be (in *my* sense of 'the world')—then it seems to me that they are entities which lack determinate identity-conditions. This, of course, is at odds with the popular doctrine, mentioned earlier, that possible worlds are 'maximal consistent sets of propositions', because sets *have* to possess determinate identity-conditions, in accordance with the Axiom of Extensionality.

[285] See Wittgenstein, *Tractatus Logico-Philosophicus,* trans. C. K. Ogden, propositions 1 and 1.1.

Against me, I suppose it might be urged that, even on the conception of possible worlds as totalities of possible facts, they still have well-defined identity-conditions: for it may be urged that such two worlds are identical if and only if they contain exactly the same possible facts—that is, that two such worlds differ numerically if and only if they differ in respect of one or more possible facts.[286] But if, as I maintained in Chapter 11, facts themselves (and so also 'possible facts') lack well-defined identity-conditions, this account of the supposed identity-conditions of possible worlds plainly will not do.

Nor, obviously, will it help to propose as a criterion of identity for possible facts the principle that those possible facts are identical which exist in the same possible worlds: for this already presupposes that possible worlds themselves have well-defined identity-conditions (and, plainly, it would be circular to make fact-identity turn on world-identity while simultaneously making world-identity turn on fact-identity). Moreover, even if explicit reference to possible worlds is extruded from this principle—by rendering it directly as the principle that those possible facts are identical which are *necessarily co-existent*[287]—it still appears to be fatally flawed. It must be acknowledged that this principle is not a trivial one, because there are many kinds of entities for which necessary co-existence does *not* provide a criterion of identity: thus, for example, the natural numbers 5 and 7 are necessarily co-existent and yet are obviously not identical. However, if we are to be able to apply such a principle in the case of possible facts, we plainly need to be told what the *existence-conditions* of possible facts are. The most plausible thing to say about this is that a possible fact exists if and only if a sentence or proposition expressing that possible fact is true: for instance, that the possible fact that *P* exists if and only if *P* is true. In that case, however, the proposed identity criterion for possible facts simply reduces to this: the possible fact that *P* is identical with the possible fact that *Q* if and only if it is necessarily the case that *P* is true if and only if *Q* is true. But I criticized this criterion in Chapter 11 as being fatally flawed for a number of reasons. Moreover, when that criterion is arrived at via the assumption that the possible fact that *P* exists if and only if *P* is true, the further criticism may be levelled that the latter assumption is question-begging in the present context. For what is being assumed is that if *P* is true, then there exists a unique item which can be designated as '*the* (possible) fact that *P*'—and whether this is so is the very

[286] Van Inwagen suggests something very similar to this when he says: 'If two worlds are distinct, there must be some proposition that is true in one and false in the other' ('Why Is There Anything At All?', 101).

[287] Cf. Fine, 'First-Order Modal Theories III: Facts', 58.

question at issue. The problem is that we lack any assurance that a singular term of this form genuinely serves to pick out a unique item of any kind, because we have no clue as to how we should recognize something as being a single, identifiable fact. We are not in any way helped to do this by being told that those possible facts are identical which are necessarily co-existent. And that is why, even though 'fact' is grammatically a count noun, it strikes us as being at best whimsical to talk about *enumerating* facts—to talk, for instance, about how many facts I learned today before breakfast.

So my conclusion stands: that possible worlds—whether they really exist or not—could not be *objects,* because they lack well-defined identity-conditions. This would not, on my principles, prevent us from *quantifying* over possible worlds and using such quantification to interpret modal statements (for instance, by interpreting 'It is possible that *P*' as 'In some possible world, *P* is true')—though it *would* prevent us from employing the identity sign between variables taking possible worlds as their values. However, this is enough to present a serious problem for van Inwagen, who is committed to just such an employment of the identity sign in premisses (2), (3), and (4) of his probabilistic argument. If the 'space' of metaphysical possibility cannot be unambiguously divided up into a unique set of exhaustive and mutually exclusive alternatives, independently of our choice of descriptions for those alternatives, then it makes no sense to assign objective degrees of probability or chance to possible worlds, conceived as such alternatives. And from that it follows that it makes no sense to say that there is a probability of 0 of there actually being a world containing no concrete objects.

5. A Final Argument

Let me return to the line of argument with which I began the previous section. I queried that line of argument on the grounds that it seemed, illicitly, to treat facts as *objects.* But perhaps, after all, the argument can be restored, relying instead upon the doctrine concerning facts that I have defended in this and the previous chapter—namely, the doctrine that facts are ways the world is' (in my sense of 'the world', not Wittgenstein's). The key idea of the argument is that even if—*per impossibile,* as we should like to conclude—there were no objects at all in existence, there would still be *facts,* such as the (putative) fact that there were no objects at all in existence. But if facts just *are* 'ways the world is'—and 'possible facts' are correspondingly 'ways the world could be'—then, evidently, there could not be facts without the world, nor, hence, without objects of some sort collectively

constituting the world. So, it seems, it could *not* have been the case that there were no objects at all in existence, even accepting that facts themselves are not objects. Now, if we can maintain, as before, that the only possible *abstract* objects are universals and sets and that these could not have been the *only* objects to exist—because universals require particular instances and sets require members—then it seems that we indeed can draw our desired conclusion, that there must exist *concrete* objects of some kind or other, even if every particular concrete object that there could be is a contingent being (that is, even if there is no concrete object which exists of necessity). And this argument avoids appeal to the necessary existence of mathematical objects of any kind.

But there seems to be a problem with the argument. This is that if every particular concrete object that there could be is a contingent being, then, as Thomas Baldwin has urged, it seems that we can coherently envisage starting with a world containing finitely many such concrete objects and successively 'subtracting' them one by one until we 'reach' a world containing none at all: a world in which no concrete object whatever exists.[288] By 'a world' here is meant, obviously, a *possible world*. However, for reasons given above, I think that we can only understand a 'possible world' to be a maximal way *the world* could be—where by 'the world' I mean, as before, the sum of all existing objects or 'things'. Now, we certainly have to allow that 'the world' might have denoted a different sum of objects from the sum of objects which it actually denotes, precisely because at least some of the objects which actually exist are only contingent beings; but if we try to suppose that it might have denoted no sum of objects whatever—nothing—we run into difficulties. For to say that there is a possible world in which 'the world' denotes nothing is to say that there is a maximal way the world could have been which is not a way *the world* could have been, which is a blatant self-contradiction. This of itself does not show that Baldwin's 'subtraction' argument is flawed, for the argument does not purport to establish that there might have existed no objects whatever, only that there might have existed no *concrete* objects. However, if I am right, what defeats Baldwin's argument is the fact that there is no possible world in which only *abstract* objects exist. We may *seem* to be able to envisage such a possible world, precisely because we *abstract* from concrete reality in thinking of abstract objects, such as those encountered in mathematics. But this, I believe, is a case in which appearances deceive.

[288] See Baldwin, 'There Might Be Nothing'.

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